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ABSTRACT

This special issue of "Science Education" is designed to provide a research tool for science education researchers and students as well as information for science teachers and other educational practitioners who are seeking suggestions about science teaching objectives, curricula, instructional procedures, science equipment and materials or student assessment instruments. It consists of 3 divisions: (1) science teaching; (2) research and special interest areas; and (3) journal features. The science teaching division which contains listings of practitioner-oriented articles on science teaching, consists of five sections. The second division is intended primarily for science education researchers who are doing a literature search, and it consists of nine sections, each of which relates to a particular research or special interest area in science education. The third index division, which consists of citations in the special features of the journal, is intended for researchers carrying out historical studies in science teaching and science education. An article which contains an illustration of how questions of contemporary interest can be traced historically by using entries in this index is also included. (HM)

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CUMULATIVE INDEX TO
**science
education**

Volumes
1 through 60
1916-1976

Audrey B. Champagne

Leopold E. Klopfer

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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Publication

CUMULATIVE INDEX TO SCIENCE EDUCATION

**Volumes 1 through 60
1916–1976**

**Audrey B. Champagne
Leopold E. Klopfer**

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University of Pittsburgh
Pittsburgh, Pennsylvania 15260*



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a. Biology and Applied Biology (includes agriculture, conservation, ecology, medicine, nursing, and nutrition)	
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INTRODUCTION

Our original purpose in compiling a cumulative index for *Science Education* was to provide a research tool for students of science education. That purpose did not change as the compilation project progressed, but we did learn that the sixty volumes of the journal were sources for a greater diversity of information than we at first had realized. Beginning in 1916 as the *General Science Quarterly*, the journal's earliest primary audience was the teachers of the then recently devised General Science courses in the secondary schools and the newly evolving junior high schools. In later volumes of the journal, the audience addressed through its articles and features also included elementary school teachers, science supervisors, science education researchers, science teacher educators, high school teachers of biological and physical sciences, and college instructors of general education courses in science. Some segments of this diverse audience apparently looked to the journal for practical procedures, methods, materials, plans, and resource information for teaching science, while others probably were more concerned about the organization of science curricula and teacher preparation programs or about the systematic investigation of learning, instruction, evaluation, and other aspects of science education. The sixty volumes of *Science Education* contain copious information about all these matters, and more.

In the course of our own studies in science education, we often had occasion to draw upon the resource of information and ideas contained in *Science Education*. But doing so was laborious, for it generally involved searching through the indices of many individual volumes to find the items of interest. A single cumulative index, classified by areas that are commonly of concern to many science educators, should reduce the searching time significantly and, thereby, make the desired information more accessible. That is how we hope this cumulative index to *Science Education* will be of service to fellow students of science education. We envision that this index will be useful for (1) science education researchers who wish to have ready access to the background literature on a particular research topic; (2) teachers of science and other educational practitioners who are seeking suggestions about science teaching objectives, curricula, instructional procedures, science equipment and materials, or student assessment instruments; and (3) researchers who are carrying out historical studies of science teaching and science education in the 20th century.

The bibliographic needs of these three groups dictated what the main divisions for organizing the index would be, but the actual contents of the journal determined the sections that were included in each division. For the largest part of the journal's existence, its contents were intended to be directly useful for educational practitioners concerned with the teaching of science. Consequently, our first division in the index contains listings of practitioner-oriented articles on science teaching. This division consists of five sections, as described in the Table of Contents. The second division is intended primarily for science education researchers who are doing a literature search, and it consists of nine sections, each of which relates to a particular research or special interest area in science education. In designating the nine areas for the sections of this division (see Table of Contents), we have sought to reflect those areas of research and interest that are prominent in science education at the present time.

The third index division, which consists of citations in the special features of the journal, will be of particular interest to researchers carrying out historical studies in science teaching and science education. While such historical studies probably would focus on

one or several topics in the sections of the first and second divisions, the journal features indexed in the third division are a valuable additional resource. The journal features include abstracts of contemporary articles appearing in *other* journals and periodicals; reviews of science textbooks, science trade books, and various other reference and trade books; editorials and editorial comments; and meeting announcements, reports, and minutes of minutes of meetings for several science education associations. More than 2900 abstracts appeared in Volumes 14 through 33 of the journal and more than 6700 books were reviewed throughout the sixty volumes, but space considerations did not allow us to list all the abstracts and book reviews in the cumulative index. Hence, we had to make a judicious selection of abstracts and book reviews, as explained at the beginning of each of these sections. Nevertheless, the journal features division of the index is about as large as the other two index divisions combined.

A descriptive Table of Contents for this index appears on pp. iii-viii to provide the user with an overview of the organizing principles we have employed in presenting the references to articles and journal features in the sixty volumes of *Science Education*.

We are pleased that it has been possible to reprint in this volume (pp. xi-xxxii) our article, "A Sixty-Year Perspective on Three Issues in Science Education," which contains an illustration of how questions of contemporary interest can be traced historically by using entries in this *Cumulative Index*. [This article originally appeared in *Science Education* 61:431-452 (1977).]

Acknowledgments

This cumulative index could not have come into existence without the efforts of an exceptional educational bibliographer, Scott D. Koziol. We are very grateful for her insightful, conscientious, and continually cheerful work on this lengthy project.

We want to express our appreciation for their helpful cooperation to the librarians in the Hillman Library, University of Pittsburgh, and in the Science and Technology Section, Carnegie Library of Pittsburgh.

For their good natured assistance on a variety of tedious clerical tasks, we are indebted especially to Alexandra Antoniewicz, Joan Donnelly, and to many other helpers. Page layouts and graphics were skillfully executed by Donna Rotman.

For accomplishing the tremendous task of typing the index, we wish to particularly thank Patricia Stanton.

A.B.C.
L.E.K.

A Sixty-Year Perspective on Three Issues in Science Education:

I. Whose Ideas Are Dominant?

II. Representation of Women.

III. Reflective Thinking and Problem Solving

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The nation's bicentennial provided the impetus for a good deal of historical reflection and for a multitude of commemorative events. Coinciding with the 200th anniversary year of the nation's birth was a memorable milestone in the life of the journal, *Science Education*, in that 1976 marked the completion of the publication of sixty continuous volumes.* This occasion was appropriately commemorated in Milton Pella's appreciative and reflective editorial that headed Issue 4 of Volume 60[1]. Our own contribution to the celebration of the occasion was the preparation of a cumulative index for the sixty volumes of *Science Education*, 1916-1976[2].

Undertaking such a mammoth bibliographic task should have a greater purpose than merely commemorating a publishing milestone. Moreover, the production of a cumulative index in itself is not the kind of research activity that we value highly. This is not meant to imply that we are unappreciative of the efforts of those conscientious persons who labor long and hard to prepare good cumulative indices that become important tools for the students in a field. Such facilitating work is clearly necessary in any field which is the object of serious study. By making available a cumulative index for *Science Education*, we would like to encourage students in the field of science education to become more deeply informed about their research topics and to seek more comprehensive documentation for their studies than is frequently the case at present. Another purpose for our preparing this cumulative index is to make a modest contribution toward the encouragement of historical studies in science education. We believe that historical studies which are firmly grounded in good data can provide exceedingly valuable perspectives on many issues that confront science education today.

It is not difficult to imagine how a cumulative index could be used in historical studies both as a source of data and as a route to additional data. The section titles that we em-

* No other periodical publication devoted exclusively to education in science has a comparable record. *School Science and Mathematics* began publication in 1901 as *School Science* and continues today, but it has not been exclusively devoted to science education. The *Cornell Rural School Leaflet* (later called *Cornell Science Leaflet*) was founded in 1906 and dealt only with science, but it expired with Volume 62 in 1969. *Science Education* began as the *General Science Quarterly* in 1916 and adopted its present name in 1929. The next four oldest science education periodicals, which are still being published, are Great Britain's *School Science Review*, begun in 1919; the *Journal of Chemical Education*, begun in 1923; the *American Physics Teacher* (now the *American Journal of Physics*), begun in 1933; and the *American Biology Teacher*, begun in 1938.

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TABLE I**Sections in the *Cumulative Index for Science Education*, Volumes 1-60, 1916-1976**

SCIENCE TEACHING

- I. Aims and Objectives of Science Teaching
- II. Science Curriculum
- III. Instructional Procedures
- IV. Science Equipment, Materials, and Facilities
- V. Science Tests and Assessment Instruments

RESEARCH AND SPECIAL INTEREST AREAS

- VI. Science Education Research
- VII. Learning Theories and Processes
- VIII. Evaluation of Science Programs
- IX. Science Education History
- X. Teacher Education
- XI. Science and Society
- XII. Scientific Information
- XIII. History of Science
- XIV. Education in General

JOURNAL FEATURES

- XV. Abstracts
 - XVI. Book Reviews
 - XVII. Editorials
 - XVIII. Science Education Associations' Affairs
 - XIX. Miscellaneous Information
-

ployed to organize the *Cumulative Index for Science Education* are listed in Table I. By consulting the entries in a particular section, one can begin to investigate questions such as these: How much attention did science educators give over the 60 year period to the aims and objectives of science teaching? Which themes persisted during this time and which ideas were transitory? How much attention did science educators give in 60 years to the psychology of learning science? Which learning theories and processes were particularly emphasized? How much attention did science educators give in 60 years to problems of testing and student assessment? What solutions were devised for some student assessment problems and how well did they work? Later in this paper we will illustrate how ideas about questions like those just listed can be traced historically by utilizing entries in the *Cumulative Index for Science Education*. Before turning to that illustration, however, we would like to describe how the process of compiling the cumu-

lative index yielded some data which aided in providing a perspective on two current issues in the field of science education.

Whose Ideas Are Dominant in Science Education?

What children learn in schools about science is determined by many factors, not the least of which are the content and form of instruction. Educators generally control these two factors. By educators we mean, first of all, classroom teachers, plus supervisors of instruction in education agencies at various levels and staff members associated with education in colleges and universities. Educators are rarely of one mind regarding what the content and form of instruction in schools should be, and this is particularly true in science education. There is a diversity of ideas in the field, and the issue of whose ideas on science education are the most worthy remains unresolved. Although a historical study cannot settle questions of relative worth, it can shed some light on the issue by providing data concerning the sources of the ideas which have been prominent over the course of time.

As we prepared the *Cumulative Index for Science Education*, we took note of the institutional affiliations of all the authors of articles. Each time a person's name appeared either as the sole author or as a co-author of a full article, not including journal features such as abstracts and book reviews, his or her listed affiliation was tallied under one of several categories.* The main categories are:

Elementary and secondary schools. Includes all organizational combinations, e.g., middle school, junior high, academy, junior-senior high school, of grades K-12 and laboratory schools.

Education agencies. Includes school district offices, intermediate units between the district and state levels, state education departments, regional and nationwide associations, and national education agencies, e.g., U.S. Office of Education.

Colleges and universities. Normal schools, which are represented in the earlier volumes, are included in this category. Also included are special educational projects and institutes associated with a college or university.

Other. This interesting category includes industry, medicine, business, publishers, and government agencies other than education agencies. The few authors who had no listed affiliation (less than 0.5%) were also tallied here.

For each volume year, we counted the number of authors in each institutional affiliation category and calculated percentages. The results are shown in Table II. As the data in the table reveal, in the early volumes of *Science Education*, the number of authors affiliated with elementary and secondary schools was, for the most part, larger than the number of authors in colleges and universities. The mean percentages for volumes 1-10 are, respectively, 42 and 36%. In subsequent volumes the number of practitioner authors from elementary and secondary schools never again exceeds the number of authors from

* To be precise, our tallying procedure recorded the number of authorships of articles, not the number of different authors. Thus, for any person who authored more than one article in *Science Education*, his or her affiliation was tallied once for each such authorship. This straightforward procedure was used because the purpose for recording the data was simply to obtain information about the proportions of contributions to *Science Education* from persons in several institutional affiliation categories. Since the same rule for tallying was applied to persons in all affiliation categories, the proportions derived from the number of authorships can be expected to be nearly identical with the proportions derived from the number of different authors. We chose the straightforward procedure of tallying the number of authorships and did not attempt to reduce this to the number of different authors, thereby saving much arduous and needless work.

TABLE II
Affiliations of Authors of Articles in *Science Education*, Volumes 1-60, 1916-1976

Volume No.	Number of Authors	El. & Sec. Schools No.	Pct.	Education Agencies No.	Pct.	Colleges & Universities No.	Pct.	Other No.	Pct.
1	42	21	50.0	4	9.5	15	35.7	2	4.8
2	29	13	44.8	1	3.5	10	34.5	5	17.2
3	29	8	27.6	3	10.3	13	44.8	5	17.2
4	29	13	44.8	2	6.9	11	37.9	3	10.3
5	27	10	37.0	1	3.7	9	33.3	7	25.9
6	42	11	26.2	4	9.5	17	40.5	10	23.8
7	22	10	45.5	1	4.6	9	40.9	2	9.1
8	26	11	50.0	0	0.0	6	23.1	7	26.9
9	31	15	48.4	2	6.5	7	22.6	7	22.6
10	21	9	42.9	2	9.5	9	42.9	1	4.8
11	23	7	30.4	3	13.0	11	47.8	2	8.7
12	27	8	29.6	1	3.7	17	62.9	1	3.7
13	36	11	30.6	3	8.3	20	55.6	2	5.6
14	38	9	23.7	5	13.2	18	47.4	6	15.8
15	33	7	21.2	6	18.2	19	57.9	1	3.0
16	61	14	23.0	7	11.5	34	55.7	6	9.8
17	51	12	23.5	6	11.8	28	54.9	5	9.8
18	43	17	39.5	4	9.3	21	48.8	1	2.3
19	30	8	26.7	2	6.7	20	66.7	0	0.0
20	37	9	24.3	5	13.5	23	62.2	0	0.0
21	31	7	22.6	8	25.8	16	51.6	0	0.0
22	58	22	37.9	2	3.5	31	53.5	3	5.2
23	62	24	38.7	7	11.3	25	40.3	6	9.7
24	76	25	32.9	11	14.5	36	47.4	4	5.3
25	77	24	31.2	7	9.1	33	42.9	12	15.6
26	31	11	35.5	3	9.7	15	48.4	2	6.5
27	30	5	16.7	1	3.3	18	60.0	3	10.0
28	68	15	22.1	9	13.2	36	52.9	8	11.8
29	37	9	24.3	1	2.7	23	62.2	4	10.8
30	39	16	41.0	3	7.7	16	41.0	4	10.3
31	52	7	13.5	3	5.8	33	63.5	9	17.3
32	46	10	21.7	3	6.5	28	60.9	5	10.9
33	59	11	18.6	5	8.5	36	64.4	3	5.1
34	52	7	13.5	2	3.9	41	78.9	2	3.9
35	59	12	20.3	2	3.4	41	69.5	4	6.8
36	53	13	24.5	2	3.8	36	67.9	2	3.8
37	42	1	2.4	2	4.8	39	92.9	0	0.0
38	46	4	8.7	5	10.9	35	76.1	2	4.4
39	52	3	5.8	5	9.6	42	80.8	2	3.9
40	81	12	14.8	11	13.6	57	70.4	1	1.2
41	68	7	10.3	6	8.8	50	73.5	5	7.4
42	91	15	16.5	13	14.3	59	64.9	4	4.4
43	85	16	18.8	9	10.6	56	65.9	4	4.7
44	79	9	11.4	8	10.1	61	77.2	1	1.3
45	103	15	14.6	10	9.7	74	71.9	4	3.9
46	106	12	11.3	8	7.6	81	76.4	5	4.7
47	109	12	11.0	9	8.3	80	73.4	8	7.3
48	82	7	8.5	11	13.4	60	73.2	4	4.9
49	107	16	15.0	8	7.5	77	72.0	6	5.6
50	102	14	13.8	11	10.8	70	68.6	7	6.9
51	110	9	8.2	2	1.8	98	89.1	1	0.9
52	99	5	5.1	10	10.1	81	81.8	3	3.0
53	114	11	9.7	3	2.6	95	83.3	5	4.4
54	92	10	10.9	7	7.6	75	81.5	0	0.0
55	101	1	1.0	7	6.9	93	92.1	0	0.0
56	94	0	0.0	6	6.4	87	92.6	0	0.0
57	78	0	0.0	2	2.6	75	96.2	1	1.3
58	111	3	2.7	5	4.5	103	92.8	0	0.0
59	121	7	5.8	9	7.4	105	86.8	0	0.0
60	97	2	2.1	3	3.1	92	94.9	0	0.0

colleges and universities. After Volume 30 (1946), the erosion of contributions to *Science Education* from practitioners in schools becomes particularly marked. Concurrently the number of college and university authors per volume markedly rises. For volumes 51–60, the mean percentage of authors from schools is less than 5%, while it is 89% for college and university authors. The shift in the institutional affiliations of *Science Education* authors between the journal's early years and the 1970s can be characterized as no less than dramatic.

Science educators affiliated with education agencies may be thought of as practitioners who are once or twice removed, depending on their agency's level, from the daily happenings in the classroom. On the whole, these practitioners have contributed a small but fairly steady percentage of authorships per volume of *Science Education* throughout its 60 years. In volumes 1–10, the mean percentage of authors affiliated with education agencies is 6%; in volumes 51–60, it is 5%. These percentages are certainly not large, but they are impressive when considered in relation to the percentages for authors who are teachers in schools. The number of persons teaching science in schools exceeds the number of science educators in various education agencies by at least a factor of 20. Yet, in the most recent ten-year period, there were about as many education agency authors of *Science Education* articles as there were teacher authors. Science educators in education agencies can hardly be considered a silent minority.

Another interesting observation that can be made from Table II concerns the extent of contributions made by authors in the "Other" category. In most of the earliest volumes of *Science Education*, there were more authors from this group than authors in education agencies. The mean percentage for volumes 1–10 is nearly 16%. Thereafter the percentage of authors per volume in the "Other" category declines, but lingers on at a respectable level in several years, notably during and after the World War II era covered by volumes 25–32 (1941–1948). However, for volumes 51–60, the mean percentage has dropped to less than 1%. We suspect that the diminution and eventual disappearance of contributions to *Science Education* from authors outside education is a reflection of the growing "professionalization" of science education. As this process proceeds, more and more professionals in the field must publish their work and their ideas, so that soon little space remains in the profession's journal for outsiders.

Our data have also shown that space in *Science Education* has been increasingly devoted to the publications of science education professionals affiliated with colleges and universities. To the extent that publication in the profession's journal is an index of whose ideas are most prominent, science educators at colleges and universities are virtually uncontested today. As measured by the ratio of publication in *Science Education*, the ideas of teachers in schools are but rarely heard. This has not always been so. Our survey of the affiliations of *Science Education* authors indicates that in former years more equity in the opportunity to express ideas prevailed among educators in colleges and universities, educators in education agencies, and educators who teach science to children in schools. Whether or not the present situation is most beneficial for the science education of these children is something to consider.

Representation of Women in Science Education

The recognition of women's equality and right to equal opportunities in all affairs of life is a significant issue throughout the fabric of today's society. So, too, is it a pressing

TABLE III
Sex of Educator Authors of Articles in *Science Education*, Volumes 1-60, 1916-1976

Volume No.	Year	Number of Educator Authors	Female		Male		Unidentified
			No.	Pct.	No.	Pct.	
1	1916-17	40	0	0.0	38	95.0	2
2	1917-18	24	2	8.3	19	79.2	3
3	1918-19	24	5	20.8	19	79.2	0
4	1919-20	26	7	26.9	17	65.4	2
5	1920-21	20	2	10.0	16	80.0	2
6	1921-22	32	16	50.0	15	46.9	1
7	1922-23	20	1	5.0	18	90.0	1
8	1923-24	19	2	10.5	14	73.7	3
9	1924-25	24	7	29.2	14	58.3	3
10	1925-26	20	2	10.0	18	90.0	0
11	1926-27	21	0	0.0	19	90.5	2
12	1927-28	26	4	15.4	22	84.6	2
13	1928-29	34	6	17.7	26	47.1	2
14	1929-30	32	5	15.6	26	81.3	1
15	1930-31	31	7	22.6	23	74.2	1
16	1931-32	55	7	12.7	47	85.4	1
17	1933	46	6	13.0	39	84.8	1
18	1934	42	5	11.9	36	85.7	1
19	1935	30	5	16.7	24	80.0	1
20	1936	37	4	10.8	32	86.5	1
21	1937	31	6	19.4	25	80.7	0
22	1938	55	9	16.4	45	81.8	1
23	1939	56	12	21.4	43	76.8	1
24	1940	72	14	19.4	57	72.2	0
25	1941	65	13	20.0	51	78.4	1
26	1942	29	9	31.0	20	69.0	0
27	1943	27	5	18.5	20	74.1	2
28	1944	60	12	20.0	48	80.0	0
29	1945	33	4	12.1	29	87.9	0
30	1946	35	3	8.6	32	91.4	0
31	1947	43	8	18.6	35	81.4	0
32	1948	41	11	26.8	30	73.2	0
33	1949	34	2	5.7	32	94.3	0
34	1950	50	3	6.0	47	94.0	0
35	1951	55	5	9.1	50	90.9	0
36	1952	51	10	19.6	41	80.4	0
37	1953	42	4	9.5	37	88.1	1
38	1954	44	5	11.4	39	88.6	0
39	1955	50	10	20.0	40	80.0	0
40	1956	60	9	15.0	51	85.0	1
41	1957	63	7	11.1	56	87.3	1
42	1958	87	9	10.3	78	89.7	0
43	1959	81	13	16.1	68	83.9	0
44	1960	78	7	9.0	71	91.0	0
45	1961	99	17	17.2	82	82.8	0
46	1962	101	14	13.9	86	85.2	1
47	1963	101	17	16.8	84	83.2	0
48	1964	78	18	23.1	60	71.8	4
49	1965	101	11	10.9	87	86.1	3
50	1966	95	15	15.8	77	81.1	3
51	1967	109	9	8.3	96	88.1	4
52	1968	96	10	10.4	85	88.5	1
53	1969	109	13	11.9	93	85.3	3
54	1970	92	11	12.0	80	87.0	1
55	1971	101	12	11.9	83	82.2	0
56	1972	94	7	7.5	79	84.0	8
57	1973	77	11	14.3	65	84.4	1
58	1974	111	11	9.9	98	88.3	2
59	1975	121	19	15.7	97	80.2	5
60	1976	97	11	11.3	82	84.5	4

issue in the field of science education where, as in many other areas concerned with the teaching of children, women have long been well represented. But, it is the levels at which women are involved in science education that is the issue, and whether or not women have equal opportunities to influence science education other than as classroom teachers. In the process of preparing the *Cumulative Index for Science Education*, we were able to compile some data which provide a historical perspective on this issue. We employed the same procedure for compiling the data as was used for tallying the affiliations of authors of full articles in *Science Education*. Authors whose affiliation was in the "Other" category were not counted, since our interest here was on female and male representation within science education. Judging by the given name of each educator author, we recorded whether the person was female, male, or unidentified. A considerable difficulty arose in those cases where only the person's initials and family name were listed, and we found it necessary to consult various other sources and references to reduce the number of persons in the unidentified category.* Table III displays the number and percent of female and male educator authors, and the number whose sex still remains unidentified, in each of the 60 volumes of *Science Education*.

According to our data, the percentage of female authors in a single volume ranges from a high of 50% to a low of 0%. The median for all 60 volumes is 13%. However, the percentages are not evenly distributed across different time periods, and they show a generally *decreasing* trend from the earliest ten-year period to the latest. For volumes 1-10, the mean percentage is 17%, while for volumes 51-60, it is 11%. On the assumption that being an author in the profession's journal is an index of the degree to which an individual exerts influence on the wider field of science education, these data show that women had more opportunity to be more widely influential in the earlier years of *Science Education* than in the most recent years. Measured in relation to the male authors in the profession's journal, women in science education appear to have sustained a slight loss in influence as the years have gone by.

Reflective Thinking and Problem Solving

We mentioned before that educators rarely agree on which content and form of instruction is the best, but there is one aspect of science instruction where there is a remarkable degree of agreement in the professed beliefs of today's science educators. It is the belief that reflective thinking and problem solving have an important place in children's learning of science in school. Nonetheless, this common belief is all too often not manifested in school practice. A contemporary issue of some magnitude in science education is this disparity between belief and practice regarding reflective thinking and problem solving. In this section, we shall attempt to provide a perspective on this issue

* Sources used to find complete names of authors included, among others, the volumes of the *Readers Guide to Periodical Literature* and the *Education Index*. Library of Congress catalog cards, and published membership lists and annual meeting programs of the National Association for Research in Science Teaching. In a few instances, we made an informed inference about the person's sex on the basis of institutional affiliation and title, e.g., a principal of a high school in the 1920s was identified as a male, since virtually no females were high school principals then. Sometimes an individual's given name alone (e.g., Leslie) was not sufficient to make a decision about the person's sex, and such instances were left as unidentified unless we had additional information about the person. From the names listed with the articles in the journal, the sex of some 9% of the educator authors was initially in the unidentified category. After our search, the sex of only 2.6% remains unidentified.

through a historical study that was facilitated by employing the *Cumulative Index for Science Education*.

Throughout the 60 volumes of *Science Education*, a pervasive theme is reflective thinking and its external manifestation, innovative problem solving.* It is significant that the man who made this theme pervasive in American education also authored the first article in the first volume of *Science Education*, which was then called *General Science Quarterly*. John Dewey's position is stated briefly but directly in "Method in Science Teaching[4]," that the method of science—problem solving through reflective thinking—should be both the method and valued outcome of science instruction in America's schools. This position was not challenged in the 40 subsequent volumes of the journal. In the following pages we propose to describe and analyze reflective thinking and innovative problem solving as they are represented in the volumes of *Science Education*; to show the extent to which John Dewey influenced this literature and the practice of science education, as it is reflected in *Science Education*; and to document the assertion that, even as the study of innovative problem solving and reflective thinking comes increasingly under the influence of psychology, Dewey's philosophy remains basically unchallenged. Reflective thinking continues to be regarded as a valued outcome for science education.

John Dewey contributed two articles concerning reflective thinking and problem solving to the volumes of *Science Education*; the first, "Method in Science Teaching," appeared in the journal twice[4]. The second time when it appeared in Volume 29, it was preceded by some reflections by its author. Dewey addressed the same theme in a second article, "The Supreme Intellectual Obligation," which appeared in Volume 18[5]. Both of these articles† are devoted to discussions of the value of the method of science and the responsibility of science educators to make the method of science available to all children. "Method in Science Teaching," an address delivered before the Science Section of the National Education Association, contains a reaffirmation of John Dewey's faith in the method of intelligence‡ and states his belief that the teaching of this method should be the aim of science teaching. Dewey asserts that science gives men power because it allows them to test their beliefs and that "science . . . is knowledge at its best, knowledge in its

* There is no explicit attempt in the earlier literature of *Science Education* to define the type of problem to which reference is being made. Although Dewey believed in the application of reflective thinking to cognitive problems in all facets of human endeavour, we have limited our discussion to problems directly related to science. We have added the adjective *innovative* which Getzels[3] uses to set apart higher level cognitive problems from those lower level types of problems which do not require creative thinking for their solution.

† In another of his *Science Education* articles, "Individuality in Education[6]," Dewey touches on problem solving in a brief aside. He mentions one facet of problem solving that is recognized later in the literature as having important implications for problem solving in the schools. Dewey says:

The teacher believes there is one scientific and proper method of approaching these problems. One child does the problem in a way which diverges from the orthodox conventional method laid down by the text-book, the teacher, or the particular course of study. Instead of recognizing something valuable, something precious, something to be encouraged, the teacher frowns upon the pupil and insists on the adoption of a certain uniform method of arranging the result[6, p. 159].

‡ Dewey asserted this faith on many occasions, both before and after the present article. For example, the book that he addressed to teachers in 1910, *How We Think*, revised in 1933[7], was in a sense an affirmation of Dewey's faith in reflective thinking or the method of intelligence, which "converts action that is merely appetitive, blind, and impulsive into intelligent action[7, p. 17]." See, especially, his discussion of the values of thinking in Chap. 2 of *How We Think*.

tested and surest form[4, p. 3].” He says that “the end of science teaching is to make us aware of what constitutes the most effective use of mind, of intelligence. . . [4, p. 3].”

Consistent with his philosophy, Dewey seeks to obliterate the duality of means and ends and thus asserts that it is “important to see to it that methods of teaching [science] are such as to fulfill its true purpose[4, p. 4].” Here Dewey states unequivocally that elementary education is important in the process of educating reflective thinkers and discusses briefly the methods he believes appropriate. He urges that science teaching should be *dynamic*, truly scientific, because “the understanding of *process* is at the heart of scientific attitude[4, p. 7].” The child should be given the opportunity to construct knowledge, beginning with everyday objects and materials, and to learn from them both the ideas and the method through which they were created. Being derived as it is from the very method of the natural sciences, Dewey’s philosophy of science education was then, as it is today, most appealing to science educators. However, Dewey’s philosophy has resisted their efforts to translate it into methods of classroom practice that can be readily communicated to teachers. This is due in part to the very nature of the philosophy. Dewey’s intent to obliterate the means–end dualism and his view of intellectual activity as an integrated whole resulted in a philosophy that obstructs the kind of analysis necessary to translate it into functional methods and outcomes of sufficient simplicity to be easily communicated to practitioners. Evidence of this difficulty can be found in articles that appeared in *Science Education* between the years 1917 and 1935 on innovative problem solving and reflective thinking.

In the 17 volumes between Dewey’s first and second statements on this matter a handful of articles appeared in *Science Education* [e.g., 8–10] which suggest that several science educators had taken on the task of translating Dewey’s philosophy and method into classroom practice. It is evident from certain of their writings that, in their search for definition, they had read further into some of Dewey’s other works.* They were obviously struggling with the problem of identifying the elements and discovering the distinctions, if any, that exist among reflective thinking, scientific method, scientific problem solving, the method of intelligence, inquiry, and scientific attitude—all of which were terms Dewey used on occasion to describe the ideal of intellectual activity toward which all education should be striving.

Among the articles published in *Science Education* in the early 1930s, five describe attempts to measure the extent to which some facet of Dewey’s intellectual ideal has been engendered in students of science. Two articles by Ralph Horton, a chemistry teacher at New York City’s Seward Park High School, report on the attempt by Horton and his colleagues to measure outcomes of laboratory experiences other than those measured by written examinations.† The desired outcome is to train students to think, and two methodologies are tested to ascertain their relative effectiveness in producing the desired

* For example, although the five phases of reflective thought are not mentioned in “Method in Science Teaching,” they do appear in some of the science educators’ writings. As given in Dewey’s *How We Think*, the phases of reflective thought are: Suggestion; Intellectualization; the Guiding Idea, the Hypothesis; Reasoning (in the narrower sense); and Testing the Hypothesis by Action [cf., 7, pp. 107–115].

† An interesting aside in this article results from Horton’s attempt to attack this problem in educational experimentation as if it were a problem in chemistry. Reasoning by analogy, he asserts that his educational problem is analogous to determining relative yield from two or more chemical reactions, but he concludes somewhat less than cynically that “attempts to apply chemical methods to educational experimentation meet with obstacles[11, p. 312].”

outcome. The problem method, which used chemistry laboratory experiences to train pupils to think through problems, was hypothesized to be superior to the demonstration method on the basis that "learning *to think* and *to do* could be achieved—if at all—only through *opportunity to think and to do* . . . [11, p. 319]."

This study represents a sincere attempt to measure the extent to which Dewey's ideal might be met through the use of laboratory experiences. However, analysis of the study reveals one kind of discrepancy that occurred as attempts were made to operationalize the ideal. Although Horton concludes from his data that the laboratory group performs better on his outcome measures, the instruments used as outcome measures that he describes are tests of written information, the ability to manipulate laboratory equipment, and the ability to set up laboratory apparatus to fulfill a novel combination of specifications. These are instruments that test the ability "to do," rather than the ability to think.

The pitfall facing those who made attempts to operationalize scientific attitude and skills are also evident in the work of Florence Weller[12] of the Institute of School Experimentation at Columbia University's Teachers College. Weller attempted to answer an important question, "What are some of the attitudes and skills we can expect to develop in elementary science[12, p. 91]?" Weller's question was and still is an important one. Not only does it represent a further attempt at definition, but it also asks what may be *possible* to achieve. In retrospect, Weller's attempt at definition and operationalization was no more successful than Horton's. Weller asserted that her instruments tested for scientific attitude and the skills of observation, conclusion, proof or verification, but it is highly unlikely that science educators would agree that they are valid tests of scientific attitude or of these skills.*

Another article during this period reports the results of a study by Sam Strauss [13] to determine the extent to which a sample of Ohio high school students exhibited scientific thinking, as that process is defined by Elliot Downing's test, "Some Elements of Scientific Thinking."† Downing's instrument represents a most careful scholarly attempt to define and operationalize the concept of scientific or reflective thinking. As his source of information about the working of the minds of scientists, Downing used biographies, journals, and letters that scientists, reflecting on their work, had written. On the basis of his analysis of the reflective writings of scientists, Downing compiled a list of the steps of the scientific method,‡ the "hazards encountered at each, and safeguards to be observed at each step to ensure correct conclusions in thought processes[15, p. 121]." These successive steps and necessary safeguards were translated into an instrument designed to test certain of the elements and safeguards:

* The reader may wish to judge the validity of Weller's assertion. For some sample items from Weller's true-false test of attitude and from her multiple-choice test of the skills of observation, conclusion, proof, or verification, see Appendix I.

† It is interesting to note that Strauss's report of his use of Downing's test predates the report by Downing of his own studies using the instrument[14]. These studies are followed some three years later by an article[15] that describes the rationale for and the method of developing the instrument, along with the test itself, the scoring procedures, and analysis of the results.

‡ The list of successive steps and their accompanying safeguards appeared in an article by Downing in *The Scientific Monthly*[16]. The elements listed there and some of the safeguards are given in Appendix II.

1. To test accuracy of observation.
2. To test ability to pick out pertinent elements from a complex situation.
3. To test ability to synthesize.
4. To test selective recall.
5. To test fertility of hypothesis.
6. Does pupil clearly define a problem before trying to solve it?
7. To test ability to hold in mind a complex of relations.
8. To test problem solving ability—all elements at once.
9. To test judgment on adequacy of data.
10. Does pupil solve a problem scientifically or by the trial and error method?
11. Does pupil suspend judgment on mooted questions?
12. Can pupil apply a rule or law?
13. Does pupil test an hypothesis by collecting facts—say, measuring the lines?
14. Is pupil aware of the danger of reasoning by analogy?
15. Can pupil arrange data in sequence to make the conclusions evident[15, p. 127]?

Strauss administered the Downing test to a sample of 1,343 students in grades 8-12 and asked six questions of the data:

Which of the elements of scientific thinking are practiced most? Which least[13, p. 90]?*

[Strauss answered this question by comparing the scores students made on each of the elements and assumed that those elements on which the students scored high were practiced more than those on which students scored lower.†]

Do boys think better than girls[13, p. 91]?

[There is no evidence from this administration of the test that they do.]

Does scientific thinking improve with rise in grade status[13, p. 91]?

[There is no evidence from this administration of the test that it does.]

Does scientific thinking improve with increase in chronological age[13, p. 92]?

[There is no evidence from this administration of the test that it does.]

Is there any relationship between general intelligence and the ability to think[13, p. 93]?

[There is no evidence from this administration of the test that the relationship is marked.]

The data collected by Strauss were hardly encouraging and those data collected by Downing[14,15] were no more encouraging than Strauss's. The analysis of the data Downing collected on the administration of his test to over 2,500 students in grades 8-12 led him to conclude that there is

no evidence in the data given that high school pupils acquire skill in scientific thinking as a necessary by-product of the study of scientific subjects as at present taught[14, p. 89].

* The form of this question is interesting because of its tacit acceptance of the tenet that students learn by doing, a belief about learning which Horton had stated explicitly.

† In answer to this question, Strauss found students scored highest on recognizing a problem and lowest on reasoning by analogy. Strauss's list of the elements and safeguards, in the order of decreasing scores, was: Recognizing a Problem, Observation, Testing the Hypothesis, Synthesis, Seeing Relationships, Fertility of Hypotheses, Drawing Conclusions from Data, Arranging Data, Selective Recall, Seeing Inadequacy of Data, Formulating and Testing Hypotheses, Prejudice, Essential Relationships, Analysis, and Reasoning by Analogy.

To the extent that we can assume that information in articles which appeared in *Science Education* at this time is representative both of the commitment of science educators to the philosophy of John Dewey and of the state of practice in science teaching in America's schools, we can conclude that the commitment was strong, but that there was little evidence that attempts to translate Dewey's philosophy into practice had produced any measurable effects in the thinking ability of students.

These same two trends are evident in the *Science Education* volumes that followed Dewey's second statement at the beginning of Volume 18 about the use of the intellect in the manner of the scientist. Although 17 years had passed during which little progress was realized, science educators continued to pursue vigorously the goal of operationalizing Dewey's philosophy. The articles in volumes 18-60 of *Science Education* provide evidence of their endeavors. During these four decades, progress was made in analyzing into its components the complex process of scientific inquiry. Also, from among these components, elements were selected which are appropriate for instruction at various grade levels. To aid them in identifying appropriate methods for teaching these elements, some science educators have sought guidance from several theories on the psychology of learning. Psychological theories of personality have also been brought to bear on the question of identifying factors that motivate certain individuals to seek out problems and to solve them. But, despite science educators' sophisticated research directed toward translating Dewey's philosophy into practice, there is little evidence in the literature that the desired outcome has been achieved even to a minimal degree.

In the article, "The Supreme Intellectual Obligation[5]," John Dewey takes note of the pervasive influence of science and its technological applications in most aspects of life, and the consequences of this fact. He asserts that this situation requires the further application of knowledge and intelligence. This is the "supreme obligation of intellectual activity." Dewey continues:

The field of education . . . has hardly been touched by the application of science. . . . the scientific attitude, the will to use scientific method, and the equipment necessary to put the will into effect, is still, speaking for the mass of people, inchoate and unformed[5, pp. 2-3].

The concern of education should be with creating "a certain mental attitude," rather than "purveying a fixed body of information, or . . . preparing a small number of persons for the further specialized pursuit of some particular science[5, p. 3]."

The responsibility of science cannot be fulfilled by educational methods that are chiefly concerned with the self-perpetuation of specialized science to the neglect of influencing the much larger number to adopt into the very makeup of their minds those attitudes of open-mindedness, intellectual integrity, observation, and interest in testing their opinions and beliefs that are characteristic attitudes of scientists. . . . Every course in every subject should have as its chief end the cultivation of these attitudes of mind[5, p. 3].

Dewey is especially critical of elementary education, which he views as

the virgin field practically untouched by the influence of science. . . . So little attention is given to instilling, as a part of organic habit, trust in intelligence and eager interest in its manifestation. . . . little is done to secure full operation of what native intellectual capacity there is. . . . it is now everywhere subordinated to the acquisition of special

skills and the retention of more or less irrelevant masses of facts and principles . . . [5, p. 3].

The ideas presented in this opening article of Volume 18 of *Science Education* are reflected again and again in the content and themes of articles in the volumes of the journal that followed thereafter. Scientific attitude, scientific method, scientific problem solving both as method of instruction and as an outcome of instruction, and the subordination of factual knowledge to the method of the intellect—all these themes are evident in volumes 18–60 of *Science Education*.

Dewey's article in Volume 18 is similar in certain ways to his earlier article in Volume 1, and it seems to have exerted a similar kind of influence on science educators. On the surface at least, Dewey's admonition was quite clear and readily accepted by science educators, but the complexities of the outcomes he was suggesting for education were so great that efforts to translate them into practice continued to be frustrated. For example, eight attempts are reported in the journal to define the elements of scientific attitude.* These studies were predicated on arguments similar to the one expressed in Volume 19 by Ira Davis[17]. Education is recognized as growth through problem solving. The question is then posed, "What method will be used to develop this philosophy?" Davis says that "the purpose of science teaching is to develop the ability in an individual to solve the problems that confront him," and that to do this, the individual will need: "(1) scientific attitude, (2) scientific method of procedure, and (3) a fund of information[17, p. 117]." But before instruction can be designed to meet any one of these three needs, the elements of each need must be defined. Thus, Davis and other science educators sensed the necessity for compiling a list of the characteristics of scientific attitude.

A most scholarly procedure for generating a valid list of the elements of scientific attitude was devised by Robert Ebel[18]. As did many other investigators, Ebel composed his preliminary list by consulting the writings of the world's most respected scientist-philosophers. The preliminary list in Ebel's case was refined using explicit criteria.† Of what use were these lists? They were responsible for the generation of considerable scholarly discourse, and some scales and tests were developed from them. And we might hazard the guess that they were used to communicate to teachers those behaviors they should be observing in their students.

A literature on scientific method, parallel to the scientific attitude literature, also exists in *Science Education*. The scientific method studies describe how lists of the elements

* These attempts to define the elements of scientific attitude usually were made in connection with developing a scale to assess one or several elements. See the eight studies reported by Davis[17], Ebel[18], Lampkin[19], Edwards and Robertson[20], Howard and Robertson[21], Boeck[22], Baumel and Berger[23], Billeh and Zakliariades[24], and Kozlow and Nay[25]. In addition to these attempts to define the elements of scientific attitude and to assess them, the meaning of scientific attitude and its implications were often discussed (for example, see Hurd[26], Punko[27], and Boeck[22]), and several reported studies sought to determine the effect of various instructional approaches on scientific attitude (for example, see Reiner[28], Eberhard and Hunter[29], Scott[30], Wessel[31], Harvey[32], Kahn[33], and Charen[34]). It is important to distinguish scientific attitude and its elements from attitudes toward science, scientists, or science learning, a distinction that was made clear by Aiken and Aiken[35] and by Klopfer[36]. The latter category of attitudes involves an entirely different literature, which is represented in *Science Education* by Weinstock[37], Vitrogen[38,39], Schwirian[40], and other articles.

† Ebel recognized the need for being explicit regarding criteria for refinement of the lists. He became aware of the need for an explicit methodology for the compiling of lists when he noted discrepancies among lists of elements of scientific attitude compiled by other investigators.

of scientific method were generated and used to develop tests.* There is some evidence that the tests were used to assess the extent to which classroom instruction engenders these elements in the behavior repertoire of students.† Some articles focus on scientific thinking.‡ Noteworthy among these articles are two by Mary Burmester[59,60] that describe the process she used to generate a list of behaviors involved in scientific thinking. From this list she constructed a "Test to Measure Some of the Inductive Aspects of Scientific Thinking," which is concerned with processes that parallel those noted in both the scientific attitude and method literature.§ It is not surprising, therefore, that an issue debated in several of the attitude and method articles concerns the distinction, if any, between scientific attitude and scientific method. The issue is not resolved, some authors (for example, Keeslar[62]) asserting that attitude and method are distinct entities and others (for example, Ebel[18]) supporting the point of view that the two are essentially opposite sides of the same coin.

A large number of articles focus on the theme of problem solving.¶ For purposes of analysis it is helpful to consider these articles as falling into one of three categories: articles that focus on problem solving ability as a valued outcome of instruction,|| those that focus on problem solving as a method of instruction,** and those that focus on problem solving behavior as a psychological or social phenomenon.†† The direct influence of John Dewey is most obvious, of course, in the literature on problem solving as outcome and as method.‡‡ The ubiquitous problem of translating philosophy into practice is evident also in this literature. As was true for the notions of scientific attitude and scientific method, con-

* Notable among these tests is the instrument designed by John G. Read, which was a nonverbal test of the ability to use scientific method[41]. Other tests and lists of elements of scientific method were reported by Frutchey[42], Haupt[43], and Keeslar[44].

† See, for example, the studies by Teichman[45], Reiner[46], and Atkin[47].

‡ In addition to the two discussed in the text, the scientific thinking articles include contributions by Cahoon[48], Dunning[49-51], Mason[32], Perlman[53], Monaghan[54], Kastrinos[55], George[56,57], and Charen[58].

§ Interestingly enough, Kaplin[61] used Burmester's "Test on Some Aspects of Scientific Thinking" as a means of providing instruction on elements of scientific method.

¶ For most of the articles on this theme, the article's title clearly indicates that the article is concerned with an aspect of problem solving. However, in the last 15 years or so, terms such as inquiry, discovery, process, or task frequently appear in the titles of articles whose focus is on some aspect of problem solving. These variations in terminology are due, in part, to science educators' changing perspectives on problem solving, but also to considerable sloppiness in the use of terms by authors. In grouping together the articles in *Science Education* that focus on the theme of problem solving, we have been guided, not by an article's title, but by its content. Two nicely written discussions that reflect science educators' changing perspectives in the mid-1960s can be found in articles by Lahti[63] and Fischler[64]. Similarly, the discussions by Esler[65] and Wilson[66] reflect the perspectives of the mid-1970s.

|| Articles that focus on problem solving as outcome include those by Lampkin[67-69], Jacobson[70], Meder[71], Hurd[121], Oburn and Montgomery[72], Novak[73], Butts[74], Aylesworth[75], Mahan[76], Bills[77], McCormack[78], and Dietz and George[79].

** In addition to the articles cited in the text, those that focus on problem solving as method include contributions by Bingham[80,81], Henshaw[82], Michals[83], Aylesworth[84], Dean[85], Lanquis and Stull[86], Mark and Salstrom[87], Saadeh[88], Johnson et al.[89], and Anderson et al.[90].

†† Articles in this category began to appear in *Science Education* in the 1950s and are represented by studies discussed by Solomon[91], Carpenter[92], and Weiss[93]. For more recent articles which focus on problem solving behavior as a psychological phenomenon, see the citations in footnotes on p. 445.

‡‡ Because of Dewey's means-end philosophy, explicit statements of any distinction between problem solving as method and as outcome are practically nonexistent in the *Science Education* literature.

siderable effort apparently was exerted by science educators in seeking to define the “problem solving objective.” The most comprehensive listing of the components of this objective was published in Volume 40 in an article by Ellsworth Oburn[94]. However, the work of defining the component cognitive, perceptual, and manipulative skills involved in problem solving is continuing up to the present day in research reported in the most recent volumes of *Science Education*.

The lack of practical information on how to engender problem solving behavior in students as a result of classroom practice was recognized in the 1949 report of the NARST Committee on Research in Secondary School Science[95]. The committee did not question the desirability of the objective to develop problem solving abilities, nor did they do more than to recognize the need to translate the philosophy into classroom practice. There is no recognition given in this report to articles, like those by Wood[96], Silberg[97], and Oburn and Montgomery[72], describing the techniques by which individual practitioners had attempted to develop problem solving abilities in students in their own classrooms. These “This-is-how-I-did-it” articles do not seem to be a very effective means of exerting even a moderate influence on others in the field.

The influence of the scientific study of education movement is evident in the problem-solving-as-method literature. Beginning with the 1938 report by Burnett[98], several experimental studies are reported that compare the effectiveness of *the* problem solving method with other methods of instruction.* Indicative also of the more scientific approach to the study of education is the trend—notable in the latest volumes of *Science Education*—for science educators to study problem solving within the framework of social and psychological theory. There are just a few articles that relate social and personality variables to problem solving.† These articles are reflections of more extensive work in other disciplines investigating problem solving in the context of business and technology and the application of psychoanalytical theory to the understanding of problem solving behavior. However, a more pronounced trend in the last decade or so has been the application of certain psychological theories.

Articles in volumes 56–60 of *Science Education* illustrate the trend toward the application of psychological theories of development and learning to problem solving in science education. This trend has resulted in better definition of the component skills of problem solving. The component skills are defined in the cognitive developmental terminology of Jean Piaget as mental operations overtly manifested in the ability to conserve or to exclude irrelevant variables. In the learning theoretical terms of instructional psychologists, these component skills are called process skills (e.g., observation, description, measurement). Articles describing empirical studies conceived in the context of both the cognitive developmental‡ and the learning theoretical§ frameworks have contributed to a better definition of the component skills of scientific problem solving. The better definition of problem solving skills makes it possible to design specific in-

* Representative of these Method A vs. Method B type of studies are the papers by Barnard[99], Dawson[100], Neal[101], Das[102], Nasca[103], and Mahan[104].

† This group includes articles by Chess[105], Washton[106], Blosser[107], Thorsland and Novak[108], and Mayfield[109].

‡ Studies conducted within the Piagetian framework were reported by Lengel and Buell[110], Raven[111], Lawson et al.[112], Lawson and Renner[113], Raven and Polanski[114], and Lawson[115].

§ This framework is the background for articles by Newport[116], Tomera[117,118], Bredderman[119], and Quinn and George[120].

structional activities and materials that foster these skills. In this sense, science education research studies guided by psychological theories contribute to improving and refining the use of problem solving as an instructional method. At the same time, the better definition of problem solving skills makes it possible to devise more precise and more focused procedures for assessing problem solving behavior as an outcome of science instruction. It is evident, then, that nearly 60 years after John Dewey's first article in Volume 1 of *Science Education*, science educators continue to hold in high esteem the method and outcome which Dewey advocated.

Some Perspectives

We have attempted to encapsulate the rich literature of *Science Education* devoted to reflective thinking and innovative problem solving in the perspective of certain aspects of the philosophy of John Dewey. Despite the commitment of science educators to the philosophy of John Dewey and the extensive efforts they have expended to make it a practical reality, the fact remains that little of the philosophy is evident in practice. Analysis of this situation in the context of the literature of *Science Education* suggests that, even though considerable attention was given to several different issues related to reflective thinking and problem solving, two issues were never explicitly addressed.

One issue is the extent to which it is reasonable to expect that the outcomes which Dewey suggests can be realized. With respect to this issue, it is important to consider that the kind of intellectual behavior Dewey values is not common. The science educators who attempted to add definition to the method of intelligence turned to the writings of a handful of the world's greatest scientist-philosophers. Although these lists were modified before being passed on to classroom teachers, one might expect that most teachers would be discouraged by the mere act of reading such an imposing list. How, a teacher might ask, can I be expected to teach children to engage in this kind of intellectual behavior when I don't possess many of the necessary requisites myself? How many of the science educators who were active in promulgating these objectives ever inventoried their own intellectual behavior?

The second issue concerns values. The outcomes Dewey proposes have clear personal value for Dewey and, on the basis of the literature in *Science Education*, they also have personal value for the majority of the science educators who contributed to the journal over the years. But, to what extent are they valued by the greater society, the school, and teachers? Translating philosophy and theory into practice requires more than just making method and objectives explicit. The appropriateness of the objectives for the intended learners and the extent to which the society and the school value the outcomes are issues of comparable importance.

Appendix I: Sample Items from Weller's Test

Attitude Items (True-False):

1. Finding a four leaf clover brings good luck.
2. A person dies because a star falls.
3. To go to sleep while looking at the moon causes nightmares.
4. Muskrats build houses higher than usual if the winter is to be a severe one.

Skills Items:

1. You can find out whether the sun is in different parts of the sky at different times of the day by
 - a. reading about it.
 - b. asking your teacher.
 - c. asking your father or mother.
 - d. looking to see for yourself.
2. If you notice that the sun is in a different part of the sky at different times of the day it is because
 - a. either the sun or earth moves, or both move.
 - b. somebody moves it.
 - c. it is drawn across the sky by the sun god.
 - d. it is so far away.
3. You could prove whether your answer in number 2 is right by
 - a. talking it over with another boy or girl.
 - b. asking a man who studies about the sun and stars.
 - c. doing an experiment.
 - d. deciding for yourself.
1. If it is a clear day on February 2 and the ground hog sees its shadow
 - a. there will be bad weather for 40 days after that time.
 - b. we may or may not have bad weather.
 - c. it is a sure sign of rain.
 - d. we will have good weather for 40 days after that time.
2. If it does rain for 40 days after the ground hog has seen its shadow
 - a. it is a sure sign that it must always do it every year.
 - b. it may just have happened that year.
 - c. it is a good weather forecast.
 - d. it will certainly happen again next year.
3. You can best prove your answer to number 2 by
 - a. asking the keeper of the zoo.
 - b. noting for several years whether or not we have had bad weather after the ground hog saw his shadow.
 - c. asking your father or mother.
 - d. looking it up in a science book[12, pp. 93-94].

Appendix II: Elements and Some Safeguards used by Downing**Elements of Scientific Thinking**

Purposeful observation

Analysis—Synthesis

Selective recall

Hypotheses

Verification by inference and
experiment**Safeguards**

- a. must be accurate;
- b. must be extensive;
- c. must be done under a variety of conditions.
- d. The essential elements in a problematic situation must be picked out.
- e. Dissimilarities as well as similarities must be regarded. Danger of analogy.
- f. Exceptions are to be given special attention. Selective interpretation.
- g. A wide range of experience is necessary.
- h. All possible ones must be considered. (Fertility of suggestion.)
- i. Inferences must be tested experimentally.
- j. Only one variable is permitted.

Reasoning by:

1. method of agreement
2. method of difference
3. method of residues
4. method of concomitant variation
5. joint method of agreement and difference

Judgment

- k. Data must be cogently arranged.
- l. Judgment must be passed on the adequacy of the data.
- m. Judgment must be passed on the pertinency of data.
- n. must be unprejudiced;
- o. must be impersonal;
- p. must be suspended if data are inadequate [16, pp. 231-232]

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* Almost all the articles cited in this paper appeared in the journal, *Science Education*, so that only the volume, pages, and year are given for these entries. The actual name of the journal was *General Science Quarterly* from Volume 1, Issue 1 (October, 1916)-Volume 13, Issue 3 (March, 1929), and it has been *Science Education* since then. Full citations are given for references outside this journal.

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SCIENCE TEACHING

I. AIMS AND OBJECTIVES OF SCIENCE TEACHING

includes:

Discussions of general aims of instruction in science; Statements or discussions of purposes and objectives of science programs or courses; Proposals of methods for achieving particular objectives.

- Agin, Michael L. Education for Scientific Literacy: A Conceptual Frame of Reference and Some Applications 58:403-415
- Ahrens, H. J. Edward
SEE Hunter, George W.
- Axtelle, George E. Why Teach Science? 34:162-164
- Aylesworth, Thomas G. The Need for Problem-Solving 49:156-162
- Baker, Woolford B. Science Teaching and the World of Tomorrow 34:7-15
- Barnard, J. Darrell The Yearbook As It Relates to Science Instruction in the Secondary Grades 31:300-303
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II. SCIENCE CURRICULUM

includes:

Descriptions of the organization or content of science courses, programs, or syllabi; Surveys of science offerings in one or several schools, school districts, states, or countries; Curricular proposals based on rationales other than psychological theory; Discussions of the development, design, or implementation of science curricula; Discussions of factors that influence science curricula or promote changes in schools; Reports of research on science curriculum.

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includes:

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includes:

Descriptions or discussions of printed, audio-visual, or electronic media for science instruction; Descriptions of equipment or supplies for science instruction; Surveys or descriptions of physical facilities for science instruction; Reports of research on instructional media, science equipment, or facilities.

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VII. APPLICATIONS OF PSYCHOLOGICAL THEORIES IN SCIENCE EDUCATION

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X. SCIENCE TEACHERS AND TEACHER EDUCATION

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Bayles, Ernest E. Major problems in the
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31: 104B-1055; D '31. *16: 248

The reference at the end of this entry locates the abstract of Bayles' article in *Science Education*, volume 16, page 248. The index entry also shows that the full article appeared in *School Science and Mathematics*, volume 31, pages 1048-1055, and was published in December 1931. To save space, we have used abbreviations in giving the titles of the periodicals in which the articles appeared. A guide to these abbreviations follows.

Admin = Administration	Sch = School, Schools	The abbreviations
Am = American	Sci = Science	used for months
Assoc = Association	U = University	Ja = January
Bul = Bulletin	Univ = University	F = February
Chem = Chemistry		Mr = March
Col = College, Colleges	Am J Ph = American Journal of Physics	Ap = April
Ed = Education, Educational	Cor RSL = Cornell Rural School Leaflet	My = May
Gen = General	J Ch Ed = Journal of Chemical Education	Je = June
J = Journal	J Ed Psych = Journal of Educational Psychology	JI = July
Nat = National	Nat Geo = National Geographic Magazine	Ag = August
Pop = Popular	Sch Sci = School Science and Mathematics	S = September
Pub = Publications	Sci Am = Scientific American	O = October
Quart = Quarterly	Sci G = Science Guide for Elementary Schools	N = November
R = Record	Sci L = The Science Leaflet	D = December
Rep = Report	Sci Mo = The Scientific Monthly	
Res = Research	T Biol = The Teaching Biologist	
Rev = Review	T Col R = Teachers College Record	

To prepare this section of the index, copies of all the abstracts that appeared in volumes 14 through 33 of *Science Education* were pasted on cards, and these cards were sorted into 14 main categories, corresponding to the 14 sections in the first two divisions of the index. These same categories constitute the 14 major subsections (A through N) of the present section. However, it was not possible to list references to all 2900 abstracts in this section due to space limitations.

We sought to include in the index references to abstracts of the more significant articles. Our principal criteria for inclusion were the apparent importance of the contribution to science education that the article made, the length of the article (with the longer pieces more likely to be included), and the extent of contemporary interest associated with the article's theme or its author. For articles meeting these criteria, the references to their abstracts in *Science Education* will be found under the opposite subsections below.

(Any scholar who may have a need for references to the abstracts which we have omitted in any subsection should communicate with us. We would be glad to make copies available at cost of the cards containing the omitted abstracts. Anyone requesting such copies should note that, while some abstracts were omitted in every category, there are several hundred omissions in each of these subsections: C, D, L1, L2, N.)

A. Aims and Objectives of Science Teaching

- Bayles, Ernest E. Major Problems in the Teaching of Natural Science. Sch Sci 31:1048-1055; D '31. *16:248
- Benjamin, Theodore D. The Modern Role of Physical Science Teaching. T Col R 45:272-279; Ja '44. *28:180
- Bergen, L. M. Objectives in Science Teaching. Sch Sci 31:550-559; My '31. *16:76
- Blough, Glenn O. Elementary Science Objectives. Sch Life 29:28-29; O '46. *31:103
- Brandwein, Paul F. The Modern Role of Biology Teaching. T Col R 45:265-271; Ja '44. *28:179
- Burnett, R. Will The Science Teacher and His Objectives. T Col R 45:241-251; Ja '44. *28:179
- Carlson, A. J. The Contribution of the Biological Sciences. Bul Assoc Am Col 23:72-82; Mr '37. *21:164
- Clark, Harold F. The Learning of Subject Matter. T Col R 41:102-115; N '39. *24:116
- Cunningham, Harry A. Objectives in High School Biology. Sch Sci 35:462-467; 606-612; My, Je '35. *19:135
- Curtis, Francis C. Report of the Subcommittee on General Science. North Central Assoc Quart 5:410-437; D '30. *15:122-123
- Curtis, Otis F. Education by Authority or for Authority? Are Science Teachers Teaching Science? Sci 90:93-101; Ag '39. *24:116
- Downing, Elliot R. A New Interpretation of the Functions of High-School Science. J Higher Ed 4:365-367; O '33. 18:48
- Gruenberg, Benjamin C. School Science and Public Needs. Nation's Schools 20:1-3; S '37. *22:153
- Gruenberg, Benjamin C. Vital Values in Science Teaching. Sch Sci 31:125-137; F '31. *16:76
- Holmes, Harry N. The Contribution of the Physical Sciences. Bul Assoc Am Col 23:67-72; Mr '37. *21:164
- Mann, Paul B. Why Teach Science? Sci Counselor 5:11-12, 22; Mr '39. *23:222
- Moose, Carleton A. Science in Junior High School Grades. New York State Ed 20:527; 581-582; Ap '33. *17:244
- Muthersbaugh, G. C. Objectives of a Proposed Course of Study in Physics for Senior High Schools. Sch Sci 29:943-954; D '29. *14:651
- Pilley, John G. Scientific Method. T Col R 40:317-328; Ja '39. *23:347
- Powers, S. R. Educational Values of Science Teaching. T Col R 32:17-33; O '30. *15:61-62
- Powers, S. Ralph Science in Education. New York State Ed 20:520-523; 573-579; Ap '33. *17:241
- Powers, Samuel Ralph The Science Teacher and the Changing Functions of Secondary Education. T Col R 45:234-240; Ja '44. *28:178
- Smith, Otto M. Accepted Objectives in the Teaching of General College Chemistry. J Ch Ed 12:180-183; Ap '35. *20:44
- Wallace, R. C. The Changing Values of Science. Sci 88:265-271; S '38. *23:221

B. Science Curriculum

- Babcock, Russel B. A Seventh Grade Course in Sex Education. Progressive Ed 13:374-382; My '36. *21:47
- Baker, Ross A. Some Trends in Chemical Education. Rep New England Assoc Chem Teachers 38:6-19; S '36. *21:48
- Barnett, John A. Teaching General Science. High Sch Teacher 10:293-320; D '34. *19:83
- Becker, Carl H. Secondary Education and Teacher Training in Germany. T Col R 33:262-278; 347-363; D '31, Ja '32. *16:324
- Berry, Pauline G. The First Year Chemistry Course. J Ch Ed 8:1781-1815; S '31. *16:166
- Blondell, Carleton A Selected and Annotated Bibliography of Secondary Biology. Sch Sci 33:309-319; Mr '33. *17:339
- Bray, Willis J. A Study of Achievement of Students of General Chemistry in College. Sch Sci 32:19-29; Ja '32. *16:329
- Briggs, Thomas H. General Science in the Junior High School. T Col R 33:599-609; Ap '32. *16:424
- Brown, H. Emmett Science in the New Secondary School. T Col R 35:694-707; My '34. *18:180
- Cairns, Laura A Scientific Basis for Health Instruction in Public Schools. U of Calif (Berkeley) Pub in Ed '29. *15:125-126

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- Collier, Robert A. New Type of Chemistry. *J Ch Ed* 8:2214-2226; N '31. *16:249
- Craig, Gerald S. An Elementary Teacher Looks at Secondary Science. *Progressive Ed* 10:417-421; N '33. *18:51
- Craig, Gerald S. Science and Elementary Education. *T Col R* 38:660-677; My '37. *21:254
- Craig, Gerald S. The Development of Science in Elementary Schools. *T Col R* 49:382-392; Mr '48. *32:285
- Curtis, Francis D. The Emergence of Elementary Science. *Sch of Ed Bul* (U of Mich) 4:86-88; Mr '33. *17:243
- Daffin, John B. Why the Woman Student Does Not Elect Physics. *Am Physics Teacher* 5:82-85; Ap '37. *25:255
- Dale, Edgar. Children's Questions as a Source of Curriculum Material. *Ed Res Bul* 16:57-66; Mr '37. *21:254
- Dunning, J. R., and Farwell, H. W. The Two Year Science Program in Columbia College. *Am Physics Teacher* 5:150-156; Ag '37. *22:38
- Durflinger, G. W. Shall Modern Physics Be Included in the High School Course? *Sch Sci* 32:328; Mr '32. *16:427
- Embree, Royal B., and Floyd, Oliver R. The Predictive Value of General Science. *J Ed Res* 31:650-655; My '38. *22:269
- Fitzpatrick, Frederick L. Biological Materials in the Program of General Education. *T Col R* 49:398-405; Mr '48. *32:368
- Fraser, Thomas P. Science Survey Courses in Accredited Negro Colleges. *J Negro Ed* 9:13-21; Ja '40. *24:401
- Freeman, Frank N. A Plea for General Scientific Training in Educational Institutions. *Harvard Teachers R* 2:108-116; Je '32. *16:506
- French, Sidney J. Science in General Education. *J Gen Ed* 1:200-205; Ap '47. *32:124
- Fyfe, W. H. Science in Secondary Education. *Sch Sci Rev* 16:289-297; Mr '35. *19:135
- Gamble, Joseph N. The Place of Natural Science in Programs of High School Graduates. *Sch Rev* 39:177-185; Mr '31. *16:78-79
- Gillespie, Alex S. Biology in the Education of New Germany. *Sch Sci Rev* 17:398-410; Mr '36. *21:44
- Glasoe, P. M. The Present High School Course in Chemistry--A Paradox. *J Ch Ed* 15:364-367; Ag '38. *22:370
- Gluck, Harold. What Students Want to Learn in Consumer's Education. *Teaching Biologist* 8:1-6; O '38. *22:370
- Hall, Carrol C. Concomitant Problems that Arise with the Presentation of the Subject Matter in Secondary Chemistry. *J Ch Ed* 17:240-249; My '40. *24:401
- Haupt, G. W. Grade Placement in Elementary School Science. *Sch Sci* 35:858-864; N '35. *20:43
- Hurd, A. W. Reorganization in Physics. *North Central Assoc Quart* 4:227-293; S '29. *14:651
- Kiebler, E. W., and Curtis, Francis D. A Study of the Contents of the Laboratory Course in High School Physics. *Sch Sci* 29:980-985; D '29. *14:651
- Kinsey, A. C. The Contents of the Biology Course. *Sch Sci* 30:374-384; '30. *14:649
- Lancelot, W. H. The Course in High School Chemistry. *North Central Assoc Quart* 5:494-507; Mr '31. *16:167
- Laton, Anita D. Approaches to Sex Education in the Schools. *Univ High Sch J* 16:147-155; Ap '38. *22:369
- Ludlum, Elbert M. A High School Course in Photography. *Better Photography* 2:42-44; 46-51; O '39. *24:53
- Lynch, Mary E. High School Biology as a Contributing Factor in Health Education. *Sch Sci* 31:931-951; N '31. *16:248
- McCue, J. J. G. Ancient Science in the Modern Curriculum. *Am J Ph* 16:404-408; O '48. *33:72
- Morrison, J. Cayce. A Generalist Looks at Science in the Elementary Schools. *T Col R* 37:282-289; Ja '36. *20:178
- New York State Department of Education. Elementary School Science--A Tentative Syllabus for Elementary Schools, Grades 1-6. *State Dept of Ed* 109 p.; '31. *16:423
- Neureiter, P. R. A Comparison of Science Curricula in European and American Schools. *J Ch Ed* 8:2040-2045; O '31. *16:164
- Noll, Victor H. The Extent of Chemical Education. *J Ch Ed* 12:475-481; O '35. *20:41
- Powers, Samuel Ralph. Improvement of Science Teaching. *T Col R* 40:273-283; J '39. *23:347
- Powers, Samuel Ralph. Science and General Education. *T Col R* 49:373-381; Mr '48. *32:367
- Preston, Charles E. Science and the Changing Curriculum. *High Sch J* 31:158-165; 181-182; My '38. *23:221
- Preston, C. E. Teaching High-School Science in War-Time. *High Sch J* 25:298-302; N, D '42. *27:151
- Reed, Rufus D. Range of Subjects Taught, Teaching Load, and Preparation in Science of the Science Teachers of New Jersey. *J Ch Ed* 9:326-343; F '32. *16:326
- Roller, Duane. The Physical Sciences and General Education. *T Col R* 40:329-339; Ja '39. *23:347
- Roller, Duane. The Role of the Sciences in General Education. *Am Physics Teacher* 6:244-253; O '38. *23:221

- Satterly, John Observations on the Objectives and the Teaching of Physics in England and Canada. *Am Physics Teacher* 7:1-9; F '39. *23:222-223
- Sayvetz, Aaron The Natural Science Program in the College of the University of Chicago. *J Gen Ed* 1:131-135; Ja '47. *32:124
- Sears, Paul B. Life Science in the New General Education. *T Col R* 40:340-352; Ja '39. *23:347
- Shelton, H. S. General Science. *Sch Sci Rev (England)* 14:458-467; Je '33. *17:244
- Stevens, Bertha Earth Sciences and the Children. *Progressive Ed* 7:326-333; N '30. *15:122
- Symposium: Biology. (Frank U. G. Agrellius, Lyman C. Wooster, John Breukelman, Helen Schaefer, and John Breukelman) *Teaching* 2:3-32; O '31. *16:249
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- Symposium: Science Number. (Harold F. Schaeffer, Mary Melrose, H. I. Schlesinger, J. T. Giles, Helen Heffernan, Ralph K. Watkins, Carl G. Campbell, Elizabeth Segar, William Gould Vinal, Guy M. Lisk, and Lois Meier Shoemaker) *Education* 56:385-448; Mr '36. *21:45
- Symposium: The Eight-Year Study of the Progressive Education Association. (W. M. Aikin, Harold B. Alberty, S. P. McCutchen, H. H. Giles, and A. N. Zechiel) *Ed Res Bul* 17:209-254; N '38. *23:169
- Taylor, L. W. (Chairman) Physics Instruction for Purposes of General Education. *Am J Ph* 8:49-54; F '40. *24:351
- Turner, F. W. An English Impression of American General Science. *Sch Sci* 32:585-595; Je '32. *16:509
- Vinal, William Gould The School Can Line-Up for Nature Education. *Clearing House* 10:462-466; Ap '36. *20:178
- Wakeham, G. From Concrete to Abstract in Elementary Chemistry. *J Ch Ed* 11:168-169; Mr '34. *18:180
- Wallace, Earl K. A Survey of Chemistry in Women's Colleges. *J Ch Ed* 14:285-294; Je '37. *22:264
- Washton, Nathan S. A Survey of Science Courses for General Education in Colleges. *Assoc Am Col Bul* 34:285-294; O '48. *33:301
- Webb, Charles S. The Teaching of Advanced Science Using the Demonstration Method. *Sch Sci* 38:20-28; Ja '38. *22:207
- Whitten, John H. Science for Fourth, Fifth, and Sixth Grade. *Chicago Sch J* 13:295-298, 378-381, 439-444, 481-485; F-Je '31. *16:247-248
- Williams, Harry H. Implications for Senior High School Courses in Physical Science. *T Col R* 49:415-422; Mr '48. *32:367
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C. Instructional Procedures

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- Baird, William J. Suggestions for Improving Instruction in General Science. *Ed Admin & Supervision* 18:104-114; F '32. *16:425
- Beauchamp, Wilbur L. Resume of Instruction in Science. *Education* 54:135-138; N '33. *18:119
- Bellew, Amer M. An Analysis of Biological Drawings. *Sch Sci* 30:490-497; '30. *14:649
- Bingham, N. E. Maturity in Urban Living. *Clearing House* 15:195-199; D '40. *25:347
- Bingham, N. Eldred Teaching Science and the Community. *T Col R* 45:260-264; Ja '44. *28:179
- Bingham, N. E. The Environment as a Science Laboratory. *T Col R* 40:725-735; My '39. *24:53
- Black, N. Henry Better Demonstrations in Physics. *Sch Sci* 30:366-373; '30. *14:652
- Blank, Irene R. An Experiment in Directing Thinking in Physics. *Sch of Ed J (U of Pgh)* 90-96; Mr '30. *14:651
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- Blough, Glenn O. How Does the Surface of the Earth Change? *Instructor* 50:45-54; Ja '41. *25:165
- Blough, Glenn O. How Do We Use Fire and Fuels? *Instructor* 49:45-54; O '40. *25:164
- Blough, Glenn O. How Is Electricity Important to Us? *Instructor* 50:39-48; Ap '41. *26:212

- Blough, Glenn O. How Science Helps Commerce in the United States. Instructor 52:37-46; Ja '42. *26:213
- Blough, Glenn O. How Science Helps Industry in the United States. Instructor 50:45-54; O '41. *26:213
- Blough, Glenn O. Light and How It Helps Us. Instructor 49:45-54; Ja '40. *24:172
- Blough, Glenn O. Learning About Our Plant Neighbors. Instructor 48:47-56; S '39. *24:172
- Braun, O. M. Domestic Birds. Sci G 5:1-42; S '38. *23:53
- Brauer, Oscar, Engwicht, Harry, Greene, Earnest S., and Moreland, Willard H. Communication. Sci G 3:1-54; D '36. *21:256
- Brauer, Oscar L., Brubaker, Lester H., Daugherty, Lyman H., and Hazeltine, Karl S. Products of Wood and Similar Substances. Sci G 4:1-36; F '38. *22:268
- Cahoon, G. P. Planning to Teach a Unit of Physics. Univ High Sch J (California) 12:66-78; Ag '32. *16:510
- Caldwell, Otis W., and Lundeen, Gerhard E. Changing Unfounded Beliefs--A Unit in Biology. Sch Sci 33:394-413; Ap '33. *17:335
- Caldwell, Otis W. Of What Does Good Biology Teaching Consist? Am Biology Teacher 9:27-42; N '46. *31:32
- Carter, Harriet. Saving Our Soils. J of Geography 37:308-318; N '38. *23:108
- Crouch, James E. Winter Birds. Sci G 4:1-36; Mr '38. *22:268
- Culbertson, A. C. Large Wild Mammals of California. Sci G 5:1-26; O '38. *23:53
- Cushing, Burton L. The Laboratory in Elementary Physics. Sci L 11:25-27, 22-28; N-D '37. *22:98
- Davis, Ira C. Is This the Scientific Method? Sch Sci 34:83-86; Ja '34. *18:119
- Denbigh, B. R. Weeds. Sci G 4:1-35; Ja '38. *22:267-268
- Duel, Henry W. Measurable Outcomes of Laboratory Work in Science: A Review of Experimental Investigations. Sch Sci 37:795-810; O '37. *22:38-39
- Duncan, Carl D. Insects as Enemies and Benefactors of Man. Sci G 4:1-85; O '38. *22:97
- Evans, Hubert M. The Teacher of Science and His Community. T Col R 45:252-259; Ja '44. *28:179
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- Forbes, William C. Purpose in Laboratory Experiences. T Col R 49:423-426; Mr '48. *32:368
- Frank, J. O. Contract Plan in High-School Chemistry. J Ch Ed 10:556-559; S '33. *17:339
- Frank, O. D. Utilizing the Natural Interests of Pupils in Teaching Biology. Sch Sci 30:30-41, 161-165, 265-271, 396-399; '30. *14:649
- Graves, George W. Soil, Its Use and Conservation. Sch G 4:1-54; S '38. *22:97
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- Herz, L. Ernest. Experiments with Plants. Sci G 5:1-46; Mr '39. *24:172
- Holmes, Eleanor. Reading Guided by Questions Versus Careful Reading and Re-Reading Without Question. Sch Rev 39:361-371; My '31. *16:76
- Hollis, Ralph C. Physics by an Individualized Method. Sch Sci 32:324-327; Mr '32. *16:428
- Huntress, Ernest H. Daily Chemical Anniversaries as a Teaching Tool. J Ch Ed 14:328-344; J1 '37. *22:270
- Hurd, A. W. The Workbook as an Instructional Aid. Sch Rev 39:608-615; O '31. *16:167, 326
- Ilof, Philip M. Transportation. Sci G 4:1-43; My '38. *23:53
- Jaffee, Bernard. The History of Chemistry and Its Place in the Teaching of High School Chemistry. J Ch Ed 15:383-389; Ag '38. *22:370
- Joseph, Alexander. The Best from the Science Laboratories of Experienced Teachers of Science. Sci Classroom 37:1, 4; Ap-My '48. *32:368
- Julian, Katherine L. The Story of Foods. Instructor 47:41-50; N '37. *21:256
- Kaufman, Charles. Suggested Activities in the Teaching of Human Behavior. T Biol 8:49-54; Ja '39. *23:224
- Krenerick, H. Clyde. Method of Accomplishing Laboratory Work in a Single Period. Sch Sci 36:515-523; My '36. *20:179
- Laton, Anita D. Learning to Use Science in Managing Our Lives. T Col R 40:284-296; Ja '39. *23:346
- Laton, Anita D. Planning a Unit in Biological Science. Univ High Sch J 16:1-9; O '37. 22:38
- Lindsjo, Eleanor. Our National Parks. Instructor 49:37-50; My '40. *24:350
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- Mandl, M. M. The Project Method in High School Biology. Sch Sci 31:1079-1091; D '31. *16:248
- Masten, John W. Orchard and Garden Fruit Trees of California. Sci G 4:1-28; D '37. *22:267
- Mayfield, John C. The Systematic Development of Learning Units in General Science. Sch Sci 32:250-261; Mr '32. *16:424

- Mayfield, John C. The Systematic Development of Learning Units in General Science. Sch Sci 33:40-52; Ja '33. *17:156
- Mayhall, Mildred P. and McSpadden, W. W. Life of the Past--A Unit for a Course of Study in High School Biology Sch Sci 32:711-720; O '32. *17:72
- McMurray, James P. Individualized Science Instruction in Junior-High School. High Sch Teacher 8:97-98; Mr '32. *16:424
- Meister, Morris From the Classrooms of Successful Science. Sci Classroom 17: 1; Ap-May '38. *22:271
- Meister, Morris Simple Apparatus--Difficult Ideas. Sci Classroom 18:1; Ja '38. *23:105
- Meister, Morris The Notebook Problem Sci Classroom 35:1; Mr '46. *31:33
- Moore, H. K. The Content of a Unit on the Metallurgy of Iron and Steel for Eighth Grade Problem Boys. Sch Sci 31:952-968; N '31. *16:249
- Morse, Stanley W. Water, Its Conservation and Use. Sci G 3:1-38; Mr '37. *21:256
- Naden, J. L. An Experimental Study of the Relative Values of a Direct and an Indirect Method of Teaching Study Habits in Science. Sch Sci 35:970-976; D '35. *20:44
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- Noll, Victor H. Teaching the Habit of Scientific Thinking. T Col R 35:202-212; D '33. *18:120
- Nutting, J. Morley Weather. Sch Sci 36: 733-742; O '36. *21:206
- Obourn, Ellsworth S. Stimulating Interest in Science. Sch Sci 31:224-227; F '31. *16:77
- Obourn, Ellsworth S. Teaching Scientific Method--The Scientific Method in the Classroom. Sch Sci 34:969-972; D '34. *19:82
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- Palmer, E. Laurence Field Biology in City High Schools. T Biol 9:141-144; My '40. *24:400
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- Palmer, E. Laurence More Outdoor Education. Cor RSL 41:4-56; S '47. *32:284
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- Palmer, E. Laurence Teachers Number. Cor RSL 26:1-96; S '32. *17:72
- Palmer, E. Laurence Teachers Number. Cor RSL 29:3-63; S '35. *20:43
- Palmer, E. Laurence Teachers' Number. Cor RSL 30:6-60; S '36. *21:47
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- Palmer, E. Laurence Weight; Conservation: Save the Soil. Cor RSL 29:32 pg each; 'N '35-Ja-Mr '36. *20:71
- Parker, Bertha M. Five Don'ts for Elementary Science Teachers. N.C.E.S. News Notes 4:230-231; Mr '38. *22:267
- Payne, V. F. The Lecture--Demonstration and Individual--Laboratory Methods Compared. J Ch Ed 9:1277-1294; J1 '32. *16:508
- Read, C. W. W. Safeguards Against Accidents in School Science Laboratories. Sch Sci Rev 21:964-977; Mr '40. *24:351
- Renner, George T. The Map in Modern Education. T Col R 40:703-724; My '39. *24:53
- Rosenbaum, E. J. Laboratory Work for the Chemistry Part of a General Course in the Physical Sciences. J Ch Ed 16: 658-670; D '39. *24:401
- Segerblom, Wilhelm, Hopkins, B. S., Baker, Ross A. and Rose, R. E. Symposium on Laboratory Notebooks, Records and Reports. J Ch Ed 10:403-414; J1 '33. *17:242
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- Russell, Henry Norris How Big Is the Milky Way? *Sci Am* 152:14-15; Ja '35. *19:189
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- Russell, Henry Norris Pulsating Stars. *Sci Am* 158:84-85; F '38. *22:99
- Russell, Henry Norris Stellar Atmospheres. *Sci Am* 149:204-205; N '33. *18:50
- Russell, Henry Norris The Odd New-Old Star. *Sci Am* 158:206-207; Ap '38. *22:321
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- Symposium: Iron and Steel. *Sci L* 12:1001-1017; Mr '39. *23:225
- Symposium: Our Houses. *Sci L* 7:1-14; Ja '34. *18:121
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- Symposium: Precious Metals. Chem Leaflet 5:1-32; F '32. *16:329
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- Symposium: Rubber. Building America 6:98-128. *26:108
- Symposium: Some of the Unfamiliar Elements. Chem Leaflet 5:1-32; Ap '32. *16:427
- Symposium: Spectroscopy. *Sci L* 10:25-34; Ap '37. *22:40
- Symposium: The Atmosphere. *Sci L* 12:1-16; N '38. *22:373
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M. History of Science

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- Breasted, James Henry The Beginnings of Time-Measurement and the Origins of Our Calendar. Sci Mo 41:289-304; O '35. *20:107

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- Coolidge, William D. Seventy Years of Physical Science. Pop Sci 140:52-57, 198-202, My '42. *27:153
- Crile, George Then and Now: A Century of Progress in Surgery. Sci L 7:19-24; O '33. *18:49
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- Fieser, Louis F. The Discovery of Synthetic Alizarin. J Ch Ed 7:2609-2633; N '30. *15:124
- Ford, William W. Development of Our Early Knowledge Concerning Magnification. Sci 79:578-581; Je '34. *18:182
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- Symposium: The Importance of Chemistry in America. Chem Leaflet 6:1-32; O '32. *17:157
- Symposium: Women Chemists. J Ch Ed 16:574-594; D '39. *24:401
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- Weeks, Mary Elvira The Discovery of the Elements: Chronology. J Ch Ed 10:223-227; Ap '33. *17:338

N. Education in General

- Barr, A. S. and others A Symposium on Educational Research. J Ed Res 23:24:353-382, 1-22; My-Je '31. *16:75
- Briggs, Thomas H. A Vision of Secondary Education. T Col R 34:1-17; O '32. *17:69
- Brownell, V. A., Easley, Howard and Buswell, G. T. General Conditions Affecting Teaching and Learning. Rev Ed Res 3:338-348; O '33. *17:335
- Conant, James B. How Can a Democratic Nation Fight a War and Still Stay Free? Sch and Society 54:313-315; O '41. *26:159
- Conant, James Bryant Public Education and the Structure of American Society. T Col R 47:145-195; D '45. *30:183
- Davis, Mary Houston and Rose, Elizabeth Lamar Making Theories Work. High Sch J 25:251-260; O '42. *27:77
- Dewey, John Can Education Share in Social Reconstruction? Social Frontier 1:11-12; O '34. *19:81
- Douglass, Harl R. The Effects of State and National Testing on the Secondary School. Sch Rev 42:497-509; S '34. *18:244

- Glicksberg, Charles I. Definitions in Education. High Sch J 25:18-25; Ja '42. *26:161
- Hutchins, Robert M. Ethics, Politics and Education. Sch and Society 54:257-261; O '41. *26:158
- Jessen, Carl A. Secondary Education. Bulletin No. 22, U.S. Office of Education; '29. *14:656
- Kilpatrick, William H. The Philosophy of the New Education. Sch and Society 54:481-484; N '41. *26:158
- Loomis, H. B. Educational Philosophy--Change, Invariance, or Both? Sch Rev 38:256-262; Ap '30. *14:656
- Maller, J. B. and Lundeen, G. E. Superstitions and Emotional Maladjustment. J Ed Res 27:592-617; Ap '34. *19:31
- Millikan, Robert Andrews The Education of a Scientist. Nat Ed Assoc J 31:107-108; Ap '42. *27:77
- Russell, Bertrand Education for Democracy. J Nat Ed Assoc 28:97-98; Ap '39. *23:349
- Symposium: Adventures in the Reconstruction of Education. Ed Res Bul 19:335-362; S '40. *25:54
- Symposium: American Education Viewed by European Eyes. Harvard Teachers Rec 3:7-46; F '33. *17:153
- Symposium: Conference on Philosophy of Education. T Col R 49:263-290; Ja '48. *32:214
- Symposium: Education for the Gifted. T Col R 42:375-460; F '41. *25:401
- Symposium: Progressive Practices in Secondary Schools. High Sch J 22:257-297; N '39. *24:174
- Symposium: A Progress Report of the Horace Mann-Lincoln Institute of School Experimentation. T Col R 49:305-362; F '48. *32:214
- Symposium: Techniques of Gathering Data on Characteristics of High School Students. Univ High Sch J 17:181-233; Je '39. *24:117
- Symposium: Trends in Education. Phi Delta Kappan 21:369-397; Ap '39. *23:348
- Symposium: Values and Shortcomings of Subject-fusion Projects. Calif J Secondary Ed 10:269-302; Ap '35. *19:183
- Tyler, Ralph W. Defining and Measuring Objectives of Progressive Education. Ed Res Bul 15:67-72; Mr '36. *20:175
- Watson, Goodwin and Flaser, Edward M. Education for Critical Thinking. Advanced Sch Digest 6:29-33; D '40. *25:346
- Yanch, Wilbur A. A Defense of Progressive Education, and Pratt, Karl C. Funeral Oration for the Late Progressive Educator. Sch and Society 60:65-77; J1 '44. *29:55
- Zinsser, Hans None of My Business: Or Thoughts of a Biologist on Education. Sch and Society 38:685-693; N '33. *18:48

XVI. BOOK REVIEWS

includes:

Short reviews of recently published books
relevant to science education.

The index entries for this Book Reviews section have been categorized similarly to those in the Abstracts section. The 15 main subsections into which the entries are categorized parallel to the 14 sections of this index's first two divisions and includes a Miscellaneous category for reviews of books dealing with topics not falling into any category used in the index. However, the more than 6700 book reviews which appeared in *Science Education* are far from evenly divided among the 15 main subsections, so we broke down the large subsections into appropriate subdivisions. An overview of all the subdivisions we have used can be found in the descriptive Table of Contents at the front of the index.

After preparing cards for all book reviews, we found that there were many more entries than could be accommodated in the available space for this section of the index. Consequently, we made a selection of entries of reviews to include in the index, using as our primary criterion the relevance of the book reviewed to science teaching or to a research or special interest area of science education. One result of applying this criterion is that we have included entries in the index for all science textbooks which were reviewed in the 60 volumes of *Science Education*.

In selecting entries for the index, we chose to exclude entries of reviews from subsection L, Scientific Information, if the review indicated that the book's perspective of its subject matter was not scientifically sound. For example, we deleted entries for reviews of books that describe the behavior of animals in anthropomorphic terms. We also excluded from this subsection most entries of reviews of books which dealt with technical or technological topics. For instance, few reviews are included for books on photography or radio. Many book reviews which we categorized under subsection N, Education in General, and subsection O, Miscellaneous, were not entered in the index; the entries remaining in each of these subsections simply represent the various topics of the several hundred books whose reviews we categorized there.

(Any scholar who may have a need for references to the book reviews whose entries we excluded from subsection, L, N, or O should communicate with us. We would be glad to make copies available at cost of the cards containing references to the omitted book review entries.)

A. Aims and Objectives of Science Teaching

- Blough, Glenn O. and Blackwood, Paul E. Science Teaching in Rural and Small Town Schools. '49 33:301-2
- Cohen, I. Bernard and Watson, Fletcher G. General Education in Science. '52 36:307
- Craig, Gerald S. Science in Childhood Education. '44 29:54
- Gardner, P. L. (Editor) The Structure of Science Education. '75 60:427-28
- Symposium: The Place of Science in the Education of the Consumer. '45 30:173

B. Science Curriculum

- Baker, Emily V. Children's Questions and Their Implications for Planning Curriculum. '45 32:64
- Bailey, Edna W. Science in Junior High School. '21 6:418
- Beauchamp, Wilbur L. Instruction in Science. '32 19:194
- Brandwein, Paul F. The Gifted Student as Future Scientist. '55 40:79
- Brown, H. Emmett The Development of a Course in the Physical Sciences for the Senior High School of the Lincoln School of Teachers College. '39 24:295
- Brown, Kenneth E. and Johnson, Philip G. Education for the Talented in Mathematics and Science. '53 37:349
- Brunson, Mrs. DeWitt and Dowling, Thomas I. (Editors) Suggestions for the Teaching of Science in the Twelve-Year School Program. 33:82
- Burnett, R. Will Combatting Prejudice Through Science Teaching. '52 36:256
- Caldwell, Otis W. Science Teaching in the Gary Public Schools. 4:299
- Cobb, Walter F. Chalk Talks on Health and Safety. 10:432
- Craig, Gerald S. Elementary Science. 12:496
- Craig, Gerald S. A New Science Program for Elementary Schools. '34 18:252
- Curtis, Francis D. A Synthesis and Evaluation of Subject Matter Topics in General Science. '29 13:184
- Department of Public Instruction, Commonwealth of Pennsylvania Courses of Study in Science. '32 18:56
- Dressel, Paul L. and Mayhew, Lewis B. Science Reasoning and Understanding. '54 39:170
- Fitzpatrick, Frederick L. Biology for Public School Administrators. '34 20:467
- Geer, Edith S., Waite, Evangeline and Rotter, George E. Science for Nebraska Elementary School Children. '50 36:195-6
- Gillson, Margery Stewart Developing a High School Chemistry Course Adapted to the Differentiated Needs of Boys and Girls. '37 22:45
- Heiss, Elwood D. An Investigation of Content and Mastery of High School General Science Courses. '32 16:429-30
- Heller, R. (Editor) New Trends in Biology Teaching. '71 56:572
- Hoyman, Howard S. Health Guide Units for Oregon Teachers. '46 32:61
- Humby, S. R. and James, E. J. F. Science and Education. '42 27:50
- Hurd, Archer Willis Building a Curriculum for Professional Schools with Special Reference to Nursing. '46 31:182
- Hurd, Archer W. Costs and Other Problems in Schools of Nursing. '51 36:307
- Hurd, Archer Willis What the Testing Program in the Schools of Nursing Has Taught Us. '46 31:182
- Hurd, Paul D. (Editor) New Curriculum Perspectives for Junior High School Science. '70 57:100-1
- Hurd, Paul DeHart New Directions in Teaching Secondary School Science. '69 54:391
- Jacobson, Willard J. The New Elementary School Science. '70 56:275
- Johnson, Philip G. The Teaching of Science in Public High Schools. '50 35:54
- Joseph, E. D. The Teaching of Science in Tropical Primary Schools. '53 39:167
- Karplus, Robert Theoretical Background of the Science Curriculum Improvement Study. '66 51:413
- Karplus, Robert and Thier, Herbert D. A New Look at Elementary School Science. '67 52:91
- Kern, O. J. Outline of Course of Instruction in Agricultural Nature Study for the Rural School of California. 4:299
- Kilander, H. F. Health Instruction in the Secondary Schools. '52 38:181
- Kilander, Holger Frederick Science Education in the Secondary Schools of Sweden. '31 16:257

- Lackey, Earl E. Introductory Geography for Teachers College Students. '33 20:112
- Lampkin, Richard H. Variability in Recognizing Scientific Inquiry. '49 34:322-3
- Leovenguth, J. C. General Science Syllabus. 8:451
- Lewis, June E. and Potter, Irene C. The Teaching of Science in the Elementary School. '70 56:279
- Lockard, J. David (Compiler) Report of the International Clearinghouse on Science and Mathematics Curricular Developments. '67 51:402
- Martin, Michael Concepts in Science Education. '72 57:552
- Martin, W. Edgar The Teaching of General Biology in the Public High Schools of the United States. '52 37:349
- Maryland State Department of Education The Teaching of General Science in High School; The Teaching of High School Chemistry; The Teaching of High School Physics; The Teaching of High School Biology. 6:343
- Maxwell, Paul A. Cultural Natural Science for the Junior High School. '32 17:159
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- National Science Foundation Course and Curriculum Improvement Projects. '66 51:413
- Nelson, George E. The Introductory Biological Sciences in the Liberal Arts College. '31 16:337
- Nixon, Alfred F. Teaching Biology for Appreciation. '50 34:267
- Noll, Victor H. (Chairman) The Forty-Sixth Yearbook of the National Society for the Study of Education, Part I. Science Education in American Schools. '47 31:329
- Palmer, E. Laurence Nature Magazine's Guide to Science Teaching. '36 22:101
- Parker, Bertha M. An Introductory Course in Science in the Intermediate Grades. '31 16:521
- Pella, Milton O. The Status of Science Offerings in Wisconsin Schools in 1955-56. '56 41:238
- Persing, Ellis C. A Manual for General Science in the Ninth Grade. 6:343
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- VanDeventer, W. C. Course Outline for General Biology. '44 30:108
- Walters, Verna Science Education for the Elementary Schools of Ohio. '45 33:307

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- Wetherington, Julia Science for the Elementary School. '41 33:308
- Whitla, Dean K. and Pinck, Dan C. Essentially Elementary Science. '73 59:434-36
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- Applied Chemistry for High School Students. '49 36:60-61
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- Course of Study in General Science. '17 2:470
- Course of Study in Hygiene; Course of Study in Geography. 8:533
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- Course of Study in Science for Senior High Schools. 20:114
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- The Iowa Plan for Atomic Energy. '50 36:61
- Preparing Elementary Pupils for the Era of Atomic Energy. '50 36:196
- Resource Guide for General Biological Science. '51 37:140
- Science--A Tentative Syllabus for Elementary Schools, Grades 1-6. '32 17:164
- Science for Oregon Schools, Part I. Elementary and Junior High School Grades. '48 36:196
- Science for the Oregon Schools, Part II. High School Science. '49 36:61
- Science in Everyday Living. '47 32:289
- Science in the Elementary School. '45 31:117
- Syllabi on High School Subjects: Including General Science, Physiography, Botany, Horticulture and Zoology. 3:52
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- A Suggested Science Program for the Elementary School. '48 33:306
- Tentative Syllabus in General Biology. '31 16:341-42

C. Instructional Procedures

1. Methods and Procedures of Instruction

- Abell, Fred H. The How Book of Grade School Science. '48 33:307
- Althouse, Rosemary and Cecil Main, Jr. Science Experiences for Young Children. 60:431
- Anderson, O. Roger Teaching Modern Ideas of Biology. '73 57:556
- Andress, J. Mace Health Education in Rural Schools. 3:237
- Andrews, W. A. (Editor) A Guide to the Study of Freshwater Ecology. '72 57:556
- Arey, Charles K. Science Experiences for Elementary Schools. '42 27:79-80
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- Arnold, Herbert J. The Selection, Organization, and Evaluation of Localities Available for Unspecialized Field Work in Earth Science in the New York City Region. '36 21:224
- Arthur, Paul Lecture Demonstrations in General Chemistry. '39 25:406
- Astell, Louis A. and Odell, Charles W. High School Science Clubs. '32 16:526
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- Baker, Tunis Baker Nature Study Packet; Baker Physical Science Packet; Baker Science Study Guide for Use with Baker Physical Science Packet; Air, Aviation, Weather; Pupil Study Guide for Use with the Baker Physical Science Packet: Magnetism, Electricity. 53:175
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- Bauer, W. W. and Edgley, Leslie Your Health Dramatized. '39 23:227
- Beakley, John C. and others The Source Book of Marine Sciences. '70 56:277-78
- Beeler, Nelson F. and Branley, Franklyn M. Experiments in Optical Illusion. '51 36:199
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- Bingham, N. Eldred Teaching Nutrition in Biology Classes. '39 23:351
- Blackwood, Paul E., Ruchlis, Hyman and Brandwein, Paul Discoveries in Magnetism and Junior Scientist's Kit. '56 41:345
- Blough, Glenn O. An Elementary Science Group at Work. '41 26:216
- Blough, Glenn O., Brink, Ida K. and Dolman, Helen Elementary Science for All Grades. 21:215; 24:353
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- Caldwell, O. W. and Meier, L. Open Doors to Science. 11:65
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- Clemensen, Jessie Williams Study Outlines in Physics. '33 17:340

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- Comstock, Ann Botsford Handbook of Nature-Study. '31 16:259
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- Davis, Helen Miles Science Exhibits. '55 41:344
- Davison, H. F. A Collection of Chemical Lecture Experiments. '26 14:566
- Downing, Elliot R. A Source Book of Biological Nature Study. 4:298
- Elder, Albert L. Demonstrations and Experiments in General Chemistry. '37 22:162
- Exelby, Clyde L. and Gambill, Lida Bell Science Club Manual. '31 16:81
- Ferguson, Ruby, Boland, James and Linton, Alma Atomic Understanding. '51 37:141
- Fowles, G. Lecture Experiments in Chemistry. '37 22:338
- Frank, J. O. Teaching First Year Chemistry. 8:603
- Frank, J. O. and Barlow, Guy J. Mystery Experiments and Problems. '45 33:307
- Frewin, J. G. A New Experimental Science. 11:134
- Garrison, Charlotte G. Science Experiences for Little Children. '39 24:177
- Greene, Kingsley L. and Ochs, Charles C. Outdoor Education: Secondary Science, Elementary Science. '66 51:407
- Greenlee, Julian Better Teaching Through Elementary Science. '54 39:64-5
- Greenlee, Julian Teaching Science to Children. '51 35:221-22
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- Gregg, James R. Experiments in Visual Science for Home and School. '66 51:400
- Gross, Herbert H. Resource Materials Elementary Science. '54-'55 41:344
- Haub, Hattie D. F. How to Teach Secondary Chemistry. '29 17:81
- Haupt, George W. (Chairman) Safety Through Elementary Science. '49 33:302
- Hawk, Burton L. The Chemistry We Use. '53 37:350
- Hennessy, David E. Elementary Teacher's Classroom Science Demonstrations and Activities. '64 52:97-8
- Hethershaw, Lillian A Guide for Teaching Science in Grades One to Eight. '37 22:334
- Hirsch, Joseph Alcohol Education. '52 37:280
- Hochman, Vivienne and Greenwald, Mildred Science Experiences in Early Childhood Education. 41:345
- Hollenbeck, E. Irene and Stevenson, Elmo Nall Selected Procedures in Teaching Biology. '50 35:134-35
- Hudspeth, Jack and Hudspeth, Frances Handbook for Teachers of Elementary Science. '47 33:302
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- Kellor, Katharine Working with Electricity. '31 16:525
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- Lansdown, Brenda The Electro-Magnetic Background of the Atom. '51 39:239
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- Laton, Anita D. and Bailey, Edna W. Suggestions for Teaching Selected Material from the Field of Sex Responsiveness, Mating and Reproduction. '40 25:409
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- Laton, Anita D. and Powers, S. Ralph New Directions in Science Teaching. '49 34:322
- Leining, Edna Bridge Millions of Years in a Winter. '35 20:521
- Lemon, Harvey B. and Marshall, Fitz-Hugh The Demonstration Laboratory of Physics at the University of Chicago. '39 24:295
- Lockwood, Elizabeth A. Activities in Nutrition Education for Kindergarten Through Sixth Grade; Goals for Nutrition Education for Elementary and Secondary Education. 33:301
- Long, Ernestine M. J. Project Kit. '39 24:357
- Lutz, Frank E. Nature Trails: An Experiment in Outdoor Education. 11:60
- Lynde, Carleton John Science Experiences with Inexpensive Equipment, Science Experiences with Home Equipment and Science Experiences with Ten-Cent Store Equipment. '51 36:256
- Mallinson, George G. Sponsoring the Science Club. '48 33:302
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- Miller, George J. (Editor) Geography How to Teach It. '34 20:112
- Mills, Lester C. and Dean, Peter M. Problem-Solving Methods in Science Teaching. 50:400
- Montgomery, Elizabeth Rider Keys to Nature's Secrets. '46 31:118

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- National Education Association If You Want to Do a Project. '54 40:79
- Nelson, Leslie W. and Lorbeer, George C. Science Activities for Elementary Children. '52 39:93
- Partridge, J. A. Natural Science Through the Seasons. '47 33:307
- Patterson, Margaret E. (Editor) Science Clubs of America Sponsor Handbook. '54 39:170
- Patterson, Margaret E. and Kraus, Joseph H. Thousands of Science Projects. '53 38:184
- Payne, E. George Education and Accident Prevention. 5:187
- Porter, Harold M. and Porter, Jermain D. Chemcraft Experiment Book: Directions for Performing 814 Experiments. '37 22:334
- Preston, Ralph C. Science: An Approach in the Elementary School. '45 31:117
- Ramsey, Grace Fisher Project Making in Elementary Science. '34 20:111
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- Rosevear, Francis Burt The Science Craft Mineralogy Manual. '35 20:113
- Roy, Mary Massey (Editor) Probe. '62 50:399
- Russell, Helen Ross Ten-Minute Field Trips. '73 58:137
- Schultz and Marcuccio, Phillis Investigation in Ecology--Looking into Earth's Life Systems and Man's Impact on Environment. '72 57:107-8
- Schwartz, Julius Adventures in Biology. '34 20:110
- Schwartz, Julius Adventures in Biology. '40 25:168
- Science Clubs of America Sponsor Handbook. '51 36:62
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- Shoemaker, Lois M. and Shoemaker, Morris B. Science in the Lanning Demonstration School of the State Teachers College, Trenton, New Jersey. '44 30:177
- Simmons, Maitland P. The Young Scientist. '51 36:59-60
- Slavson, S. R. and Speer, Robert K. Science in the New Education. '34 19:87
- Spielman, Harold S. Electronics Sourcebook for Teachers. '65 50:191
- Stepp, Ann Setting Up a Science Project. '66 51:401
- Stevens, R. A. Out-of-School Science Activities for Young People. '69 56:570-71
- Suchman, J. Richard Inquiry Box Teacher's Handbook. '67 52:(1)BC
- Sund, Robert, Tullery, Bill W. and Trowbridge, Leslie W. Elementary Science Discovery, Lessons, Physical Science, Biological Science, and Earth Sciences. '70 57:98
- Sutton, Richard Manliffe Demonstration Experiments in Physics. '38 22:333
- Tildsley, John L. Teaching Science as a "Way of Life." 13:186
- Trizenberg, Henry J. Individualized Science--Like It Is. '72 58:136
- Troyer, Donald L., Kellogg, Maurice G. and Anderson, Hans O. Sourcebook for Biological Sciences. '72 57:108-9
- van Kloster, Henry S. Lecture Demonstrations in Physical Chemistry. 7:143
- Vinal, William Gould Nature Recreation. '54 42:271
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- Weisbruch, Fred T. Lecture Demonstration Experiments for High School Chemistry. '51 37:350
- Wine, Madeline M., Westerberg, Virginia and Anderson, Ronald D. The Laidlaw Science-Readiness Charts. '67 51:411
- Woodring, Maxie Nave, Oakes, Mervin E. and Brown, H. Emmett Enriched Teaching of Science in the High School. '41 26:216
- Zim, Herbert S. Science for Children and Teachers. '53 37:286
- Zim, Herbert S. This Is Science. '45 30:178-9
- Bibliography of Science Teaching in Secondary Schools 10:432
- Conservation--Natural Resource Use Workshop Reports of Field Experiences. '52 37:278
- Earth and Space Guide for Elementary Teachers; Teaching Guide for the Earth and Space Science Course. 51:413
- Experiments with Water; Experiments with Air; Experiences with Fuels and Fires; Experiences with Heat; Experiences with Magnetism and Electricity; Experiences with Sound; Experiences with Light and Color. '50, '51 37:141
- Family Planning, Population Problems, and the Secondary School Population. '66 51:396
- Food and Nutrition. '45 31:120
- General Science Teacher's Manual. 2:306
- Guide to Tillamook Burn Replanting Project. '52 37:350
- How to Organize a Science Club. 23:397
- A New Development in Natural Science Pedagogy. Nature Magazine as a Current Text for Classroom Instruction in Natural Science. '36

Science (single issue of Baltimore Bulletin of Education). '51 36:195
 Science and the Young Child. '36 21:52
 Science for Today's Children. '53 39:92
 Science in Everyday Living. '48 33:83; 33:306; 36:197
 Science Objectives and Devices for Their Evaluation; Teacher's Chart for the Selection of Available Elementary Science Books; How Can I Detect the Gifted Science Student?; Science Vocabulary at the Ninth Grade Level; Magnetism and Electricity; Simple Machines; Heat, Light, and Sound; Microscopic Slide Kit; Chemistry; Universe; Sound; and Weather, Air, Water, and Their Relationships. 37:268

Science Teaching Techniques--XI. '64 51:BC
 The Sky Book. '31 16:527
 A Source Book of Science Experiences for Elementary School Children; Kindergarten and Primary Grades; Volume One for Intermediate Grades; Volume Two for Intermediate Grades. '49 36:196-7
 Teaching Aid Bulletins for Elementary Science. '38 23:54

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 Baxter, Tompsie and Young, Bess M. Ships and Navigation. '33 18:191
 Bee, Lowell R. Weather and the Weatherman. '53 38:118
 Connor, William H., Cross, Burnett, Evans, Hubert and Tannenbaum, Harold Electric Power and Social Policy. '51 37:140
 Cray, Ryland W., Evans, Hubert M., Gotlieb, Albert and Light, Israel The Challenge of Atomic Energy. '48 33:316
 Davis, Lillian B. Prevention of Communicable Diseases. '31 17:350
 De Leon, Benjamin The Story of the Thermometer. '46 30:319
 Edge, Rosalie Our Nation's Forests. '38 23:113
 Evans, Everett Conservation of South Dakota's Natural Resources. '53 38:413
 Hand, Harold C. (Editor) Living in the Atomic Age. '46 32:44
 Lumley, Ellsworth D. Eagles; Hawks. '35 20:109-110
 Lumley, Ellsworth D. Owls. '37 22:326
 Persing, Ellis C. (Editor) The Book of Knowledge Science Series. 11:134
 Phillips, M. V. Physical Geography: Interpreting the Physical Features of the Earth. '66 14:397

Rose, Mary S. and Bosley, Bertlyn Our Cereals--A Nutrition Unit for the Fourth, Fifth, and Sixth Grades of the Elementary School. '38 23:57
 Wittick, Eugene C. The Development of Power. '39 23:235
 The Atom and You. '50 36:61
 Compton's Pictured Teaching Unit-Materials. '35 21:171
 The Earth and Its Neighbors; Pets; Birds; Suggestions for Science Observations and Experiences in the Elementary School; Spring Season; Suggestions for Science Observations and Experiences in the Elementary School: Autumn and Winter. 36:196
 Eyesight Conservation. 9:208
 Food and Nutrition. '55 40:244
 Forests and the Natural Water Cycle. '57 41:345
 Learning about Atomic Energy. '50 36:61
 Poliomyelitis: A Source Book for High School Students; Poliomyelitis: A High School Teacher's Guide. '54 39:240
 Practical Problems in Physical Science. '40 26:216
 Safety in General Science. '48 33:310
 Science Creates a Modern Industry. '47 32:292

D. Instructional Media, Science Equipment, and Facilities

1. Textbooks for the Elementary School Student
 - a. General Science (includes text series for elementary school grades K-8 and junior high school grades 7-9)

Barber, F. D. First Course in General Science. 1:240
 Barber, Fuller, Prior and Adams Science for Beginners. 6:417
 Barber, Fuller, Prior and Adams. Lessons in Science. '22 8:533

Barnard, J. Darrell, Stendler, Celia, Spock, Benjamin, Braidford, Margaret and Atkin, J. Myron The Macmillan Science--Life Series. '62 51:408
 Beauchamp, Wilbur L., Mayfield, John C. and West, Joe Young Science Problems Series. '38-'39 22:337; 23:291

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- Beauchamp, Wilbur L., Mayfield, John C. and Hurd, Paul DeHart Teacher's Edition Science Problems 1; Teacher's Edition Science Problems 2; and Teacher's Edition Science Problems 3. '65 52:(3)IBC
- Beauchamp, Wilbur L., Mayfield, John C. and Hurd, Paul DeHart Science Is Explaining 7 and 8. '63 52:(3)IBC
- Beauchamp, Wilbur L., Mayfield, John C. and West, Joe Young Teachers Guidebook for Science Problems Book 1; Science Problems Book 2; Teachers Edition A Studybook for Science Problems Book 1. '52 37:338
- Beauchamp, Wilbur L., Melrose, Mary and Blough, Glenn O. Discovering Our World Series, Books 1-3. '37-'39; '47 22:156; 24:175; 32:289; 32:290
- Bedford, Edgar A. General Science. 6:417
- Bowden, Garfield A. General Science. 7:298
- Brandwein, Paul F., Cooper, Elizabeth K., Blackwood, Paul E. and Hone, Elizabeth B. Teacher's Edition Concepts in Science 1-6. '66 51:410
- Brandwein, Paul F., Hollingsworth, Leland G., Beck, Alfred D. and Burgess, Anna E. Science for Better Living. '50 34:324-25
- Brandwein, Paul F., Hollingsworth, Leland G., Beck, Alfred D. and Burgess, Anna E. Science for Better Living Series, Books 1-3. '53; '55 37:339; 40:70
- Brownell, Herbert General Science and the Economics of Daily Life. 3:51
- Bruce, Guy V. Children's Play-at-Science Series. '38; '43 23:54; 28:294
- Caldwell, Otis and Curtis, Francis D. Everyday Science. '43 27:79
- Caldwell, Otis W. and Eikenberry, W. L. Elements of General Science. 1:241
- Caldwell, Otis W. and Eikenberry, W. L. Elements of General Science. 8:601
- Caldwell and Eikenberry Elements of General Science with Experiments. 11:60
- Caldwell and Eikenberry General Science. 3:51
- Caldwell and Meier Open Doors to Science. 10:354
- Carpenter, Harry A. and Wood, George C. Our Environment: Its Relation to Us. '28 12:565
- Carpenter, Harry A. and Wood, George C. Our Environment: Its Relation to Us. '33 18:186
- Carroll, Franklin B. Interpreting Science; Understanding Our Environment; Understanding Our World; Understanding the Universe. '39 23:395
- Carroll, Franklin B. Interpreting Science Series: Understanding Our Environment; Understanding Our World; Understanding the Universe. '47 32:292-93
- Carroll, Franklin B. Interpreting Science Series. '52 37:346
- Clark, Bertha M. An Introduction to Science.
- Clark, Bertha M. New Introduction to Science. '28 12:566
- Clement, A. G., Collister, M. C. and Thurston, E. L. Our Surroundings. 12:494
- Clement, Arthur C., Collister, Morton C. and Thurston, Ernest L. Our Surroundings. '31 18:189
- Corwin, Mae Johnson and Corwin, Walling Junior High School Science. '31 18:54
- Corwin, Walling and Corwin, Mae Johnson The Science of Plant and Animal Life. '31 16:253
- Coulter, John G. Elementary Science. 3:52
- Craig, Gerald S. et al. New Pathways in Science, Books 1-7. '40-'41 24:354; 26:216
- Craig, Gerald S. et al. Our World of Science Series, Books 1-8. '46-'47 31:104; 31:105; 31:182; 32:288
- Craig, Gerald S. et al. Science Today and Tomorrow Series, Books 1-9. '54-'56 39:64; 40:242; 41:336
- Craig, Gerald S., Burke, Agnes, Baldwin, Sara E., Hurley, Beatrice D., Condry, Margaret G. and Johnson, Goldie Pathways in Science (6 vols.). '32 16:429
- Davis, Ira C., Burnett, John and Gross, E. Wayne Science: A Story of Observation and Experiment; Books 1 and 2. '54 39:236
- Davis, Ira C. and Sharpe, Richard W. Science: A Story of Discovery and Progress. '47 31:274
- Deming, Frank R. and Nerden, Joseph T. Teachers Manual for Science in the World of Work (Vols. I and II). '36 20:185
- Dowling, Thomas J., Freeman, Kenneth, Lacy, Nan and Tippet, James S. Understanding Science Series. '56 41:336
- Fihuff, Lewis General Science, First Course. 1:242-43
- Fall, Delos Science for Beginners. 2:306; 2:415
- Fischler, Abraham S., Lowery, Lawrence F. and Blanc Sam S. Beginning Science Materials, Beginning Science Charts, Progress Book for Beginning Science, Teacher's Guide for Beginning Science. A Modern Approach. '66 51:409
- Fischler, Abraham S., Lowery, Lawrence F. and Blanc, Sam S. Science. A Modern Approach, Books 1-6 and Teacher's Editions. '66 51:408
- Fowler, George W., Collister, Morton C. and Thurston, Ernest L. Science and You; Living with Science. '52 37:345
- Frasier, George Willard et al. The Scientific Living Series. '39 22:333; 23:352
- Frasier, George Willard, MacCracken, Helen Dolman and Armstrong, Lois Gabel Scientific Living Series; How and Why Science Series. '47 32:288

- Gruenberg, Benjamin C. and Unzicker, Samuel P. Teachers Manual for Science in Our Lives. '39 24:240
- Hansen, Elizabeth and Ipsen, David C. Elementary School Science Project, Embryology: A Comparative Study of the Development of Human and Chick Embryos. '61 51:400
- Hessler, John C. Junior Science, Book I. 4:476
- Hessler, John C. The First Year of Science. 1:243-44
- Hodgdon, D. R. Elementary General Science. 2:470
- Hodgdon, D. R. Junior General Science. 6:418
- Hodgdon, Daniel R. and Sachs, Morris Nelson Life Activities; Man's Environment, and Creative Science. '39 25:350-51
- Humphries, Pauline A. and Hosey, Gertrude Romance of the Airman. '31 16:258
- Hunter, Geo. W. and Whitman, W. G. Civic Science in the Community. 6:418
- Hunter, G. W. and Whitman, W. G. Civic Science in the Home. 5:184
- Hunter, George W. and Whitman, Walter G. Doorways to Science. '47 31:274
- Hunter, George W. and Whitman, Walter G. My Own Science Problems; Science in Our Social Life; Science in Our World of Progress. '35 19:136-37
- Knox, Warren, Stone, George, Meister, Morris and Noble, Doris The Wonderworld of Science Book One, Book Two, and Book Three. '40 24:353
- Lake, Charles H. General Science. 2:359
- MacCracken, Helen Dolman, Decker, Donald G. and Ballou, Mildred T. Science Through Discovery 1. Science Through Discovery 2. Science Through Discovery 3. Teacher's Edition Sampler Science Through Discovery 1. '67 51:412
- Marshall, J. Stanley and Beauchamp, Wilbur L. Teacher's Guidebook for Science Is Books 1-6. '68 52:(3)IBC
- Meister, Morris Living in a World of Science, I-IV. '30-'31 15:276
- Meister, Morris Living with Science Series, Books I-III. '39 24:175
- Meister, Morris, Keirstead, Ralph E. and Shoemaker, Lois M. Science for a Better World. '52 37:340-41
- Meister, Morris, Keirstead, Ralph E. and Shoemaker, Lois M. Teacher's Manual for Science for a Better World. '54 39:67
- Meister, Morris, Keirstead, Ralph E. and Shoemaker, Lois M. The Wonderworld of Science, Books 7-9. '44-'46 30:171; 30:252
- Nichols, M. Louise Science for Boys and Girls. 9:280
- Novak, Joseph D., Meister, Morris, Knox, Warren W. and Sullivan, Dorothy W. The World of Science Series, Books 1-6 and Teacher's Editions. '66 51:407
- Oxenhorn, Joseph M., Idelson, Michael N. and Greenleaf, Peter Pathways in Science. '68-'71 56:282
- Parker, Bertha Morris Basic Science Education Series. Matter and Molecules; The Science of Building; How We Are Built. '47 33:303
- Patterson, Alice J. Studies in Science. 4:476
- Pease, Clara A. A First Year Course in General Science. 1:245-46
- Pieper and Beauchamp Everyday Problems in Science. 10:358
- Pieper, Charles John and Beauchamp, Wilbur Lee Everyday Problems in Science: Revised Edition. '33 17:342
- Powers, S. R., Neuner, Elsie and Bruner, H. B. A Survey of Science Series, Books 1-3. '34-'35 18:187; 18:250; 20:109
- Powers, S. R., Neuner, E. F., Bruner, H. B. and Bradley, J. H. Adventuring in Science Series. '40 24:354
- Powers, Samuel Ralph, Neuner, Elsie Flint, Bruner, Herbert Bascom and Bradley, John Hodgdon Adventuring in Science Series. '46 31:181
- Reed, W. Maxwell The Earth for Sam. '30 17:259
- Reh, Frank and Wheat, Frank M. Science and Life, Books 1-6. '38-'39 23:395
- Ring, Thomas J., Freeman, Kenneth, Dowling, Thomas I., Lacy, Nan and Tippet, James S. Understanding Science Series, Books 1-6. '51 36:193; 37:268
- Rohan, Ben J. Exploratory Science, A Means of Life Guidance. '31 16:257
- Rowell, Percy E. Elementary General Science, Book I. 1:246
- Rowell, Percy E. Introduction to General Science with Experiments. '13 1:246
- Schneider, Herman and Nina Let's Find Out. '46 31:116
- Schneider, Herman and Nina Heath Elementary Science Series, Books 1-6. '54-'55 39:65; 39:66; 40:242
- Schneider, Herman and Nina This Is Science in Action. '65 50:48C
- Smith Everyday Science Projects. 10:434
- Smith, Herbert A., Blecha, Milo K. and Sternig, John Science 1-6 (Teacher's Edition). 51:411
- Smith, Paul E. and Wood, George C. Carpenter and Wood's Our Environment Series. '52 37:341
- Smith, Victor C., Clarke, Katherine and Henderson, Barbara Elementary Science Series, Books 1-9. '56 41:240; 41:336
- Smith, Victor C., Clarke, Katherine and Henderson, Barbara Science for Modern Living Series, Books 1-9. '51 36:60; 36:193
- Smith, Victor C. and Jones, W. E. General Science. '55 41:83
- Smith, Victor C. and Trafton, Gilbert H. Science in Modern Life Series. '42 27:45

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- Anderson, C. L. and Langton, C. V. Health Principles and Practices. 49:114
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- Carver, Thomas Nixon, Woolman, Mary Scherick and McGowan, Ellen Beers Textile Problems for the Consumer. '35 19:195-96
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- Barrows, Henry R. Elements of General Biology. '36 21:212
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- Stewart, A. W. and Ashbaugh, E. J. Physics Test. '16:340
- Torgerson, T. L., Rich, C. L. and Ranney, Harriet Torgerson-Rich-Ranney Tests in Physics. '35 22:324
- Tyler, Ralph W. Constructing Achievement Tests. '34 20:110
- Watson, Goodwin and Glaser, Edward Maynard Watson-Glaser Critical Thinking Appraisal. '52 38:423
- Wells, George (Editor) Comprehensive Objective Tests in High School Subjects. '22:324
- Zyve, D. L. Stanford Scientific Aptitude Test. '30 16:526
- Columbia Research Bureau Tests--Physics; Plane Geometry. '11:290
- Gates-Strang Health Knowledge Tests. '38 23:112
- Health Interests of Children. '47 32:114
- Standardized Science Tests--General Science. '6:596

F. Science Education Research

- Arnsperger, Varney C. Measuring the Effectiveness of Sound Pictures as Teaching Aids. '33 18:56
- Atkins, Wesley C. Some Probable Outcomes of Partial Self-Direction in Tenth-Grade Biology. '21:54
- Baird, D. O. A Study of Biology Notebook Work in New York State. '29 15:74
- Bond, Austin D. An Experiment in the Teaching of Genetics. '40 25:1
- Brewer, Waldo Lyle Factors Affecting Student Achievement and Change in a Physical Science Survey Course. '43 29:53
- Caldwell, Otis W. and Lundeen, Gerhard E. Do You Believe It? '34 18:250-51
- Caldwell, Otis W. and Lundeen, Gerhard E. An Experimental Study of Superstitions and Other Unfounded Beliefs. '32 17:340
- Curtis Investigations in the Teaching of Science. '11:62
- Curtis, Francis D. Investigations of Vocabulary in Textbooks of Science for Secondary Schools. '30 20:100
- Curtis, Francis D. Second Digest of Investigations in the Teaching of Science. '31 16:80
- Curtis, Francis D. Third Digest of Investigations in the Teaching of Science. '39 23:291
- Dieter, Morris Richard The Relationship Between Scores on the Scholastic Aptitude Test and Marks in Mathematics and Science. '37 23:177
- Fraser, James Anderson Outcomes of a Study Excursion. '39 24:293
- Gemmill, Anna M. An Experimental Study at New York State Teachers College at Buffalo to Determine a Science Program for the Education of Elementary Classroom Teachers. '37 22:163
- Haupt, George W. An Experimental Application of a Philosophy of Science Teaching in an Elementary School. '30 22:272
- Hill, Katherine Elizabeth Children's Contributions in Science Discussions. '47 32:291
- Horton, Clark W. and the Committee on the Teaching of Botany, E. L. Stover, Chairman An Experimental Study of the Teaching of Botany in the Colleges and Universities of the United States. '38 24:293

- Hurd, A. W. Cooperative Experimentation in Materials and Methods in Secondary School Physics. '33 17:340
- Hurd, Archer W. Factors Influencing Student Success in Medical Education. '50 34:325
- Hurd, Archer W. Problems of Collegiate Success or Failure with Particular Reference to Professional Schools of Medicine. '49 34:271
- Hurd, A. W. Sound, Hearing, and Music Used as an Experimental Teaching Unit. '34 18:254
- Hurd, Archer Willis An Experiment in the Use of a Teaching Unit in Science. '33 17:343
- Klopp, William J. The Relative Merits of Three Methods of Teaching General Science in the High School. '30 16:524-25
- Lawlor, Elizabeth Phelan Research in Science Education, 1953 Through 1957. '71 56:573-74
- Layton, David (Editor) Studies in Science Education. '74 59:139-141
- Leighton, R. W. Studies of Laboratory Methods of Teaching. Seashore, Robert H. Qualitative Aspects in the Improvement of Science Teaching. '35 22:156
- Meister, Morris The Educational Value of Certain After-School Materials and Activities in Science. 6:419
- Obourn, Ellsworth S. Analysis of Research in the Teaching of Science July 1955-July 1956. '58 44:155
- Rulon, Phillip Justin The Sound Motion Picture in Science Teaching. '33 18:200
- Shuster, Carl N. A Study of the Problems in Teaching the Slide Rule. '40 25:234
- Tyler, Ralph W. Service Studies in Higher Education. '32 20:110
- Urban, John Behavior Changes Resulting from a Study of Communicable Diseases. '43 28:295
- West, Joe Young A Technique for Appraising Certain Observable Behavior of Children in Science in Elementary Schools. '37 22:209
- Wray, Robert P. The Relative Importance of Chemical Information for General Education. '33 18:53
- Anonymous Summaries of Studies in Agricultural Education. '48 35:55
- Research Needs in Geographic Education. '67 51:401

G. Applications of Psychological Theories

- Anderson, Ronald D., DeVito, Alfred. Dyrli, Odvard Egil, Kellogg, Maurice, Kochendorfer, Leonard and Weigand, James Developing Children's Thinking Through Science. '70 56:275-76
- Bedell, Ralph C. The Relationship Between the Ability to Recall and the Ability to Infer in Specific Learning Situations. '34 20:234
- Howard, Frederick Thomas Complexity of Mental Processes in Science Teaching. '43 29:218
- Kogan, Zuse Essentials in Problem Solving. '56 42:184
- Laton, Anita D. The Psychology of Learning Applied to Health Education Through Biology. '29 14:384
- Navarra, John Gabriel The Development of Scientific Concepts in a Young Child. '55 40:242
- Oakes, Mervin E. Children's Explanation of Natural Phenomena. '48 32:373
- Taylor, Calvin W. and Barron, Frank Scientific Creativity: Its Recognition and Development. '63 51:416
- Terman, Lewis M. Scientists and Non-Scientists in a Group of 800 Gifted Men. '54 41:241
- Vaidya, Narendra Some Aspects of Piaget's Work and Science Teaching. '70 57:92-94
- Waters, Eugene A. A Study of the Application of an Educational Theory to Science Instruction. '42 27:79

H. Evaluation of Science Programs

- Hurd, Archer W. Evaluating Student Success in Medical Education. '51 36:306-07
- Hurd, Archer Willis Problems of Science Teaching at the College Level. '29 14:652
- Powers, S. R. High School Chemistry. 9:64
- Webb, Hanor A. General Science Instruction in the Grades. 6:499

I. Science Education History

- Central Association of Science and Mathematics Teachers. A Half Century of Science and Mathematics Teaching. '50 38:426
- Hornberger, Theodore. Scientific Thought in the American Colleges 1638-1800. '46 30:175
- National Education Association. 1937 Proceedings of Department of Science Instruction. '37 22:336
- Pollin, Burton R. (Editor). Toward Excellence in Education: Writings in Honor of Dr. Morris Meister. '66 50:58C
- Powers, S. R. History of the Teaching of Chemistry. 5:185
- Tomikel, John. Trends in American Geological Education During the Critical Years 1954-1960. '72 58:135
- Underhill, Orra E. The Origins and Development of Elementary-School Science. '41 26:215
- Woodhull, John F. The Teaching of Science. 3:120
- Wrightstone, J. Wayne and Meister, Morris (Editors). Looking Ahead in Education. '45 30:162
- Zim, Herbert S. (Editor). First National Convention of the National Science Teachers Association. '53 37:348
- 1938 Proceedings Department of Science Instruction of the N.E.A. '38 23:57-58
- 1939 Proceedings of N.E.A. Department of Science Instruction. '39 25:167-68
- Science Instruction and America's Problems. '40 26:109

J. Science Teachers and Teacher Education

- Berry, James D. Teaching Agriculture. 9:138
- Billig, Florence G. A Technique for Developing Content for a Professional Course in Science for Teachers in Elementary Schools. '30 14:660
- Blough, Glenn O. and Blackwood, Paul E. Teaching Elementary Science. '48 33:302
- Blough, Glenn O. and Huggett, Albert J. Elementary School Science and How to Teach It. '51 35:232
- Blough, Glenn O. and Huggett, Albert J. Methods and Activities in Elementary School Science. '51 35:222
- Brown, Kenneth E. and Obourn, Ellsworth S. Qualifications and Teaching of Mathematics and Science Teachers in Maryland, New Jersey, and Virginia. 50:28C
- Brownell and Wade. The Teaching of Science and the Science Teacher. 10:354
- Burnett, R. Will. Teaching Science in the Elementary School. '53 37:287
- Butts, David P. The Teaching of Science. '74 60:428-29
- Butts, David P. Teaching Science in the Elementary Schools. '73 60:127
- Carin, Arthur A. and Sund, Robert R. Teaching Science Through Discovery. '70 56:280-81
- Cole, William E. The Teaching of Biology. 18:249
- Collette, Alfred T. Science Teaching in the Secondary School. '72 58:138-39
- Commission on College Physics: Preparing High School Physics Teachers II. '72 57:89
- Conrad, Howard L. and Meister, Joseph F. Teaching Procedures in Health Education. '38 23:112
- Craig, Gerald S. Science for the Elementary School Teacher. '40 25:167
- Croxtan, W. G. Science and the Elementary School. '37 21:216
- Cunningham, H. A. Material Facilities Needed in the Training of Intermediate Grade Teachers in Science. '40 25:167
- Dowling, Thomas I., Freeman, Kenneth Lacy, Nan and Tippet, James S. Helping Children Understand Science. '54 39:66
- Downing, Elliot Rowland. An Introduction to the Teaching of Science. '34 18:185
- Eikenberry, W. L. The Teaching of General Science. 6:568
- Ewart, John L., Graves, Ed., Herrala, Leo, Keith, Charles and Patch, Della. A Guide for Self-Improvement in Science Teaching. '53 39:180
- Falk, Doris. Biology Teaching Methods. '71 57:552-53
- Frank, How to Teach General Science. 11:63
- Frank, J. O. The Teaching of High School Chemistry. '32 16:342
- Future Scientists of America Foundation. Careers in Science Teaching. '55 40:79
- Gega, Peter C. Science in Elementary Education. '70 55:584

- Heiss, Elwood D., Obourn, Ellsworth S. and Hoffman, C. Wesley. Modern Methods and Materials for Teaching Science. '40 24:175
- Heiss, Elwood D., Obourn, Ellsworth S. and Hoffman, Charles W. Modern Science Teaching. '50 34:327-328
- Hoff, Arthur G. Secondary Science Teaching. '47 32:220
- Hubler, Clark. Working with Children in Science. '57 41:334
- Hunter, George W. Science Teaching. '34 18:184
- Hurd, Archer Willis. Building a Course Within a Professional Curriculum. '47 32:64
- Kinsey, Alfred C. Methods in Biology. '37 22:48
- Lacey, Archie D. Guide to Science Teaching in Secondary Schools. '66 51:402
- Newberry, N. Y. The Teaching of Chemistry. '34 18:193
- Noll, Victor H. The Teaching of Science in Elementary and Secondary Schools. '39 24:175
- Novak, Joseph D. The Improvement of Biology Teaching. '70 55:583
- Olson, Ove S. Methods of Teaching High School Biology--A Syllabus. '34 20:111-112
- Olson, Ove S. Methods of Teaching High School Biology. '40 25:168
- Parkins, A. E. (Chairman) The Teaching of Geography. '33 18:124
- Preston, Carleton E. The High School Science Teacher and His Work. '36 21:215
- Renner, John W. and Stafford, Don G. Teaching Science in the Secondary School. '72 58:135
- Rusk, Rogers D. How to Teach Physics. 8:600
- Tomikel, John. Teaching and Earth Science in the Secondary School. '72 58:136-37
- Trafton, Gilbert H. The Teaching of Science in the Elementary Schools. 3:120
- Twiss, George R. Science Teaching. 2:359
- Vaidya, Narendera. The Impact of Science Teaching. '71 57:94-5
- Victor, Edward. Science for the Elementary School. '65 51:402
- Victor, Edward and Lerner, Marjorie S. Readings in Science Education for the Elementary School. '67 51:402
- Walker, Herbert. Health in the Elementary School. '55 41:346
- Washton, Nathan S. Teaching Science Creatively in the Secondary Schools. '67 51:397
- Washton, Nathan S. Teaching Science in Elementary and Middle Schools. '74 58:279
- Wells, Harrington. Elementary Science Education in American Public Schools. '51 35:222-23
- Wells, Harrington. Secondary Science Education. '52 36:313
- Wells, Harrington. The Teaching of Nature Study and the Biological Sciences. '36 21:170

K. Science and Society

- Ahlberg, Clark D. and Honey, John C. Attitudes of Scientists and Engineers About Their Government Employment. '51 35:229
- Allen, Chalinder The Tyranny of Time. '47 31:337
- Ashford, Mahlon (Editor) Trends in Medical Education. '49 34:140
- Baker, John R. The Scientific Life. '43 29:106
- Barter, E. G. Relativity and Reality. '53 38:246
- Bates, Marston The Nature of Natural History. '56 34:341
- Baxter, James Rhinney Scientists Against Time. '47 31:336
- Beery, Pauline G. Stuff. '30 14:658
- Bell, Eric T. Man and His Lifebelts. '38 23:230
- Bent, Silas Slaves by the Billion. '50 23:115-16
- Bernal, J. D. The Social Function of Science. '39 24:57
- Bernal, J. D. The Social Function of Science. '67 52:513
- Bridgman, P. W. The Nature of Physical Theory. '36 21:115
- Brodie, Bernard (Editor) The Absolute Weapon: Atomic Power and World Order. '46 30:243-44
- Bronowski, J. The Common Sense of Science. '53 38:242
- Brown, Harrison Must Destruction Be Our Destiny? '46 30:302-03
- Burchard, John Ely Mid-Century: The Social Implications of Scientific Progress. '50 34:341
- Bush, Vannevar Endless Horizons. '46 30:304
- Bush, Vannevar Science the Endless Frontier. '45 29:28
- Campbell, John W. The Atomic Story. '47 31:332
- Cannon, Walter B. The Way of an Investigator. '45 30:167
- Carrel, Alexis Man, the Unknown. '35 22:213
- Clifford, William Kingdom The Common Sense of the Exact Sciences. '46 30:320
- Collins, A. Frederick The New World of Science. '34 21:166
- Cousins, Norman Modern Man Is Obsolete. '45 30:165
- Crowther, J. G. and Whiddington, R. Science at War. '49 34:332
- Daniels, Farrington and Smith, Thomas M. (Editors) The Challenge of Our Times. '53 38:424; 41:246
- Dantzig, Tobias Aspects of Science. '37 23:233
- Dietz, David Atomic Energy in the Coming Era. '45 30:164
- Downing, Elliot R. Science in the Service of Health. '30 14:658
- Ebersson, Frederick The Microbe's Challenge. '41 26:57
- Eddington, Sir Arthur The Philosophy of Physical Science. '39 25:238
- Eichler, Philip A Philosophy of Science. '36 21:212
- Einstein, Albert Essays in Science. '54 39:184
- Fechner, Gustav Th. (Transl. Lowrie) Religion of a Scientist. '46 32:223-24
- Feynman, Richard The Character of Physical Law. '67 52:513
- Frank, Philipp Foundations of Physics. '46 30:321
- Fuller, Watson (Editor) The Biological Revolution. '72 57:104-05
- Gamow, George Atomic Energy in Cosmic and Human Life. '46 30:303
- George, William H. The Scientist in Action. '38 24:57
- Gibney, Frank B. and Feldman, George J. The Reluctant Space-Farers. '66 52:514
- Gilbert, Mabel Crawley and Gilbert, Ross Winthrop Origin of Species by-Special Creation. '46 31:36
- Goran, Morris Science and Anti-Science. '74 60:129
- Gray, George W. New World Picture. '36 22:50
- Grohman, Arnold (Editor) Social Implication of Biological Education. '72 57:553-54
- Gruenberg, Benjamin Science and the Public Mind. '35 21:223
- Haldane, J. B. S. Science and Everyday Life. '40 24:408
- Hale, William J. Chemistry Triumphant. '32 17:344

- Harding, T. Swan. The Degradation of Science. '31 16:517
- Haslett, A. W. Everyday Science. '37 25:57
- Hawley, Gessner G. and Leifson, Sigmund W. Atomic Energy in War and Peace. '45 30:165
- Haynes, Williams. Chemical Economics. '33 20:117
- Haynes, William. Southern Horizons. '46 30:311
- Heisenberg, Werner. Physics and Philosophy. 52:90
- Heyl, Paul R. The Philosophy of a Scientific Man. '33 19:41
- Hill, D. W. Science--Its Effect on Industry, Politics, War, Education, Religion and Leadership. '41 32:52-53
- Hjort, Johan. Human Value of Biology. '38 22:33
- Horsfall, R. Bruce. Bird and Animal Paintings. '30 16:523
- Hotchkiss, William O. Minerals of Might. '45 30:104
- Huntington, Ellsworth. Tomorrow's Children. '35 20:183
- Huxley, Julian. Heredity: East and West, Lysenko and World Science. '49 34:330-31
- Huxley, Julian. Man in the Modern World. '48 34:280
- Huxley, Julian. Unesco: Its Purpose and Its Philosophy. '47 32:56
- International Encyclopedia of Unified Science. '38 22:32
- Jackson, Ougald C., Jr. and Jones, Ralph C. The Scientific Age. '30 17:82
- Jordan, Virgil. Manifesto for the Atomic Age. '46 30:165
- Kaempffert, Waldemar. Science Today and Tomorrow. '39 25:116
- Kallet, Arthur and Schlink, F. J. 100,000,000 Guinea Pigs. '33 17:159
- Knapp, Robert H. and Goodrich, H. B. Origins of American Scientists. '52 38:326
- Lamb, Ruth De Forest. American Chamber of Horrors. '36 22:210
- Langdon-Davies, John. Man Comes of Age. '32 17:348
- Lawrence, William L. Dawn Over Zero. '46 31:331
- Lefebure, Major Victor. The Riddle of the Rhine. 6:499
- Leith, C. K. World Minerals and World Politics. '31 16:171
- Lenzen, Victor F. Procedures of Empirical Science. '38 23:236-37
- Leroy, Conel J. Life as Revealed by the Microscope: An Interpretation of Evolution. '69 56:279
- Leyson, Captain Burr W. Atomic Energy in War and Peace. '51 35:301
- Lilienthal, David E. TVA: Democracy on the March. '53 38:247
- Malinowski, Bronislaw. Magic, Science and Religion. '48 34:279-80
- Malisoff, William Marias. Meet the Sciences. '32 16:522-23
- Mannering, Eva. Frills and Flowers. '56 41:171
- Mannering, Eva. Mr. Gould's Tropical Birds. '56 41:171
- Masters, Dexter and Way, Katherine (Editors). One World or None. '46 30:243
- Mattfeld, Jacquelyn A. and Van Aken, Carol G. Women and the Scientific Professions. '67 53:178
- Meier, Richard L. Science and Economic Development: New Patterns of Living. '66 52:313
- Mercier, Andre. Analytical and Canonical Formalism in Physics. 52:520
- Miller, Merle and Spitzer, Abe. We Dropped the A-Bomb. '46 31:331
- Millikan, Robert A. Science and the New Civilization. '30 16:84
- Millikan, Robert A. Time, Matter and Values. '32 17:164
- Mills, John. The Engineer in Society. '46 30:317-18
- Mitscherlich, Alexander and Mielke, Fred. Doctors of Infamy. '49 34:274
- Moore, John A. Science for Society: A Bibliography. '71 56:437-38
- Morganthau, Hans J. Scientific Man vs. Power Politics. '46 31:336
- Morris, Charles W. Foundations of the Theory of Signs. '38 22:330
- Muller, H. J. Out of the Night. '35 21:212
- Thompson, Jerome (Editor). Science for Democracy. '46 31:40
- National Council of Teachers of Mathematics. The Metric System of Weights and Measures. '48 34:323-24
- Needham, Joseph. History Is on Our Side. '47 32:223
- Needham, Joseph. Order and Life. '36 22:103
- New York State Joint Legislative Committee on Nutrition. Meals for Millions. '47 32:219-20
- O'Brien, John A. Truths Men Live By. '46 31:47
- Owen, D. R. G. Scientism, Man, and Religion. '52 39:249
- Parker, Willis A. Our Friendly Neighbors. '45 30:180
- Pearson, Karl. The Grammar of Science. '38 22:218
- Pfeiffer, John. Science in Your Life. '39 25:57
- Piper, R. F. and Ward, P. W. The Fields and Methods of Knowledge. '29 14:570
- Planck, Max. The Philosophy of Physics. '36 21:57
- Podolsky, Edward. Doctors, Drugs and Steel. '46 30:255
- Pollack, Philip. Careers and Opportunities in Science. '68 53:179

- Pollack, Philip. Careers in Science. '45 30:55
- Poole, Lynn. Science the Super Sleuth. '54 43:282
- Popper, Sir Karl. The Logic of Scientific Discovery. '65 49:498
- Potter, Robert D. The Atomic Revolution. '46 30:303
- Potter, Van Rensselaer. Bioethics: Bridge to the Future. '71 56:440-41
- Rapoport, Anatol. Operational Philosophy. '53 38:431
- Reichenbach, Hans. Atom and Cosmos. '33 17:252
- Reiser, Oliver L. Philosophy and the Concepts of Modern Science. '35 21:59
- Report of the New York State Health Commission to His Excellency, the Honorable Franklin D. Roosevelt, Governor of the State of New York. Public Health of New York State. '32 17:82
- Ricketts, W. (Editor), Walcott, Mary Vaux Platt, Dorothy Falcon Will. The American. '41:171
- Rorty, Norman, N. Philip. Tomorrow. '47 32:117-18
- Rusk, J. Atoms, Men and Stars. '37 59
- Sacks, George. The Atom at Work. '51 35:369
- Schlegel, David. Inquiry into Science. '72 57:242-43
- Schinger, Erwin. What Is Life? '45 39:5
- Sears, Paul B. Charles Darwin: The Naturalist as a Cultural Force. '50 34:334
- Sears, Paul B. This Is Our World. '37 23:354
- Sheckell, Thomas O. Trees. '36 22:46
- Sherrington, Charles. Man on His Nature. '41 26:112
- Shortridge, Virginia. Songs of Science. '30 14:639
- Skinner, B. F. Science and Human Behavior. '53 38:436
- Slaughter, Frank G. The New Science of Surgery. '46 31:340
- Spicer, Edward H. Human Problems in Technological Change. '65 51:417
- Spivack, Morris J. Associative Evolution. '51 36:310
- Sullivan, J. W. N. The Limitations of Science. '33 20:184
- Sullivan, J. W. N. The Limitations of Science. '49 34:280
- Symposium: George Westinghouse Centennial Science and Life in the World. '46 31:327
- Toffler, Alvin. Future Shock. '71 56:438-40
- Toulmin, Stephen. The Philosophy of Science. '53 38:253
- Ward, Harold (Editor). New Worlds in Medicine. '46 31:339
- Weaver, Warren (Editor). The Scientists Speak. '47 32:222
- Weidlein, Edward R. and Hamor, William A. Science in Action. '31 19:85
- Wendt, Gerald. Science for the World of Tomorrow. '39 24:176
- Werkmeister, W. H. A Philosophy of Science. '40 25:235
- Whitehead, Alfred North. Essays in Science and Philosophy. '47 31:337
- Whyte, L. L. The Next Development of Man. '50 34:362
- Good Health Is Good Business. '48 32:290
- Serving Through Science. '46 30:320
- Women in Chemistry. '7:143
- Your Opportunities in Science. '52 33:417

L. Scientific Information

1. Biological Sciences and Applications

Note: Listings in each of the following categories are divided into: (1) Books for Children, (2) Books for Adults.

a. General Botany (Books for Children)

- Blough, Glenn O. Discovering Plants. '66 52:79
- Cosgrove, Margaret. Plants in Time. '67 52:90
- Dickinson, Alice. The First Book of Plants. '53 39:73
- DuPuy, William Atherton. Our Plant Friends and Foes. '31 15:272; 16:85
- DuPuy, William Atherton. Wonders of the Plant World. '31 16:524
- Earle, Olive L. The Strangler Fig and Other Strange Plants. '67 52:95
- Guilcher, J. M. and Noailles, R. H. A Fruit Is Born. '52:81
- MacDougal, D. T. The Green Leaf. '30 15:74
- Miner, Irene. The True Book of Plants We Know. '53 38:112-13
- Murrill, William Alphonso. Familiar Trees; Flowers. '46 31:110
- Podendorf, Illa. The True Book of Weeds and Wild Flowers. '55 41:350
- Schneider, Herman and Nina. Plants in the City. '51 36:200
- Selsam, Millicent E. Milkweed. '67 52:94
- Selsam, Millicent E. Plants that Heal. '52:94
- Selsam, Millicent E. Plants that Move. '62 52:85
- Selsam, Millicent E. The Plants We Eat. '55 41:362
- Selsam, Millicent E. Play with Leaves and Flowers. '52 37:271
- Selsam, Millicent E. Play with Plants. '49 34:68; 34:140

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- Selsam, Millicent E. Play with Seeds. '57 41:362
 Selsam, Millicent E. Play with Vines. '51 37:283
 Swift, Howard W. The Wonderful World of Plants and Flowers. '67 52:505
 Vallin, Jean The Plant World. '67 52:510
- Webber, Irma E. Bits that Grow Big. '49 33:304
 Webber, Irma E. Travelers All. '44 30:179
 Zim, Herbert S. What's Inside of Plants? '52 37:270

a. General Botany (Books for Adults)

- Andrews, Henry N., Jr. Ancient Plants and the World They Lived in. '47 33:84
 Bailey, L. H. The Garden of Bellflowers in North America. '53 39:182
 Bailey, H. L. How Plants Get Their Names. '33 19:86
 Bingham, Marjorie T. Flora of Oakland County, Michigan. A Study of Physiographic Plant Ecology. '45 29:280
 Campbell Outline of Plant Geography. '11:62
 Christensen, Clyde M. Common Edible Mushrooms. '43 28:183
 Clute, Willard N. The Useful Plants of the World. '32 19:193
 Fassett, Norman C. A Manual of Aquatic Plants. '40 25:119
 Fernald, Merritt Lyndon Gray's Manual of Botany. '50 34:342
 Fox, Helen M. The Years in My Herb Garden. '53 38:183
 Hylander, Clarence J. The World of Plant Life. '39 23:294
 Hylander, Clarence J. The World of Plant Life. '56 41:244-45
 Kamm, Minnie Watson Old-Time Herbs for Northern Gardens. '38 23:114
 Lucas, Janette May and Carter, Helene Indian Harvest: Wild Food Plants of America. '45 30:307
 McCubbin, W. A. Fungi and Human Affairs. '9:136
 Medsger, Oliver Perry Edible Wild Plants. '39 24:179
- Morton, Julia F. and Ledin, R. Bruce 400 Plants of South Florida. '52 38:106-07
 Muenschner, W. C. Weeds. '35 20:113
 Muenschner, Walter Conrad Weeds. '56 41:252
 Nicol, Hugh Plant Growth Substances. '39 25:293-94
 Novak, F. A. The Pictorial Encyclopedia of Plants and Flowers. '66 52:(4)18C
 Peattie, Donald Culross Flowering Earth. '39 24:413
 Quinn, Vernon Leaves, Their Place in Life and Legend. '37 22:332
 Riedman, Sarah R. Grass: Our Greatest Crop. '52 38:256
 Robbins, Wilfred W. and Pearson, Helen M. Sex in the Plant World. '33 19:85
 Robbins, Wilfred William and Ramaley, Francis Plants Useful to Man. '37 22:161
 Shepherd, Roy E. History of the Rose. '54 39:182
 Stanford, Ernest Elwood Economic Plants. '34 22:161
 Stemen, Thomas R. and Myers, W. Stanley Oklahoma Flora '37 21:222
 Tryon, Rolla M., Jr. The Ferns and Fern Allies of Minnesota. '54 39:249
 Verrill, A. Hyatt Wonder Plants and Plant Wonders. '39 24:179
 Yocum, L. Edwin Plant Growth. '45 30:169

b. Botany - Trees and Flowers (Books for Children)

- Beaty, John Y. Trees. '38 25:410-11
 Billington, Elizabeth T. Adventure with Flowers. '66 52:80
 Collingwood, G. H. Knowing Your Trees. '37 23:294
 Cormack, M. B. The First Book of Trees. '51 38:113
 Friesner, Gladys M. and Hill, Marian J. Wild Flowers of Spring; Wild Flowers of Summer and Late Autumn. 52:507
 Guilcher, J. M. and Noailles, R. H. (Transl. Egan and Rollin) A Tree Grows up. '72 57:95
- Harvey, Jane Wild Flowers of America. '32 20:113
 Hylander, Clarence J. Trees and Trails. '53 38:255
 Kauffman, Erle Kingdom of the Trees. '40 25:172
 Kieran, John An Introduction to Trees. 40:243
 Oppenheim, Joanne Have You Seen Trees? '67 53:179
 Peattie, Donald Culross Trees You Want to Know. '34 20:113

- Podendorf, Illa The True Book of Trees.
'54 39:74
- Potzger, J. E. What Tree Is That? 52:
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- Selsam, Millicent E. Play with Trees.
'50 34:267
- Zim, Herbert S. and Martin, Alexander C.
Flowers. '50 37:269
- Zim, Herbert S. and Martin, Alexander C.
Trees. '52 37:270

b. Botany — Trees and Flowers (Books for Adults)

- Blakeslee, Albert Francis and Jarvis,
Chester Deacon Trees in Winter. '31
20:113
- Cheyney, E. G. What Tree Is That. '30
16:251
- Clements, Edith S. Flowers of Prairie
and Woodland. '47 32:224
- Everett, T. H. A Guide to Field Flowers;
A Guide to Garden Flowers; A Guide to
Woodland Flowers. 33:304
- Felt, Ephraim Porter Our Shade Trees.
'38 23:230
- Fischer, Helen Field and Horshbarger,
Gretchen The Flower Family Album.
'41 26:55
- Fry, Walter and White, John R. Big
Trees. '38 23:113
- Green, Charlotte Hilton Trees of the
South. '39 24:299
- Green, George Rex Trees of North America.
Vol. 1--The Conifers. '33 17:343
- Green, George Rex Trees of North America.
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- Hausman, Ethel Hinckley Beginner's Guide
to Wildflowers. '48 32:291
- Heslop-Harrison New Concepts in Flower-
ing-Plant Taxonomy. '56 41:258
- Hough, Romeyn B. Handbook of the Trees
of the Northern States and Canada.
'47 32:55
- Jaques, H. S. How to Know the Trees.
'40 25:118-19
- Jegar, Edmund C. Desert Wild Flowers.
'40 25:119
- King, Julius Wild Flowers at a Glance.
'35 20:113
- King, Julius Talking Leaves. '34 20:
113
- Mathews, F. Schuler Familiar Flowers of
Field and Garden. '37 23:113-14
- McFarland, J. Horace Modern Roses III.
'47 33:78
- Moldenke, Harold N. American Wild
Flowers. '50
- Percival, Olive Our Old-Fashioned
Flowers. '50 34:343
- Pool, Raymond J. Flowers and Flowering
Plants. '29 14:658
- Preston, Richard J., Jr. North American
Trees. '48 33:78-79
- Quick, Arthur Craig Wild Flowers of the
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413
- Randall, Charles E. and Edgerton, D.
Priscilla Famous Trees. '38 23:113
- Rosendahl, C. O. and Butters, F. K. Trees
and Shrubs of Minnesota. '29 20:185
- Sitwell, Sacheverell Old Fashioned
Flowers. '39 24:413
- Stefferdud, Alfred How to Know the Wild
Flowers. '50 34:342-43
- Werthner, William B. Some American
Trees. '35 20:114

c. General Zoology (Books for Children)

- Andrews, Roy Chapman Nature's Ways. '51
38:108
- Beatty, John Y. and Allen, J. C. On Our
Farm. '32 18:198
- Blough, Glenn O. After the Sun Goes
Down. '56 43:284
- Blough, Glenn O. Who Lives in This
House? '57 44:154
- Boulenger, E. G. Infants of the Zoo.
'34 20:186
- Bridges, William Zoo Pets. '55 41:348
- Brown, Vinson How to Make a Miniature
Zoo. '56 41:347
- Bullough, William and Helena Introducing
Animals. '54 43:82
- Bullough, William and Helena Introducing
Animals with Backbones. '55 43:82
- Chace, Lynwood M. Look at Life! '40
25:176
- Colby, C. 8. The First Book of Animal
Signs. '66 52:(1)IBC
- Colby, Carroll Who Lives There? '53
39:83
- Colby, Carroll Who Went There? '53
39:83
- Chalmers, Sir Peter Mitchell The Child-
hood of Animals. 25:411-12
- Dawson, Mildred A. Farm Animals. '46
31:106
- Ditmars, Raymond L. Strange Animals I
Have Known. '31 16:519
- Ditmars, Raymond L. and Bridges, William
Wild Animal World: Behind the Scenes
at the Zoo. '37 23:56
- Ditmars, Raymond L. and Carter, Helene
The Book of Zoography. '34 20:188
- Dupuy, Wm. Atherton Our Animal Friends
and Foes. '40 25:177-78

- Earle, Olive L. Paws, Hoofs, and Flippers. '54. 41:361
- Erickson, Phoebe The True Book of Animals of Small Pond. '53 38:112
- Eschmeyer, R. W. Willie Whitetail, Freddy Fox Squirrel, Bob White, Charley Cottontail, Woody Woodcock, Tommy Trout, Billy Bass, Bobby Bluegill. '53 & '52 38:110
- Fenton, Carroll Lane Wild Folk in the Woods. '52 39:87
- Fabell, Walter C. Nature Was First. '52 38:111
- Fox, Charles Philip Opie Possum's Trick. '68 52:509
- Gibson, Derlyne How Fast Can It Go? '67 52:80
- Gray, James How Animals Move. '53 39:88
- Green, Ivah Animal Masquerade. '54 43:378
- Green, Ivah Animals Under Your Feet. '53 39:85
- Hegner, Robert Parade of the Animal Kingdom. '35 22:162
- Hogner, Dorothy Childs and Hess, Lilo Odd Pets. '51 37:283
- Holme, Bryon A Book of Animals. '40 25:171-72
- Huey, Edward G. A Child's Story of the Animal World. '35 20:187
- Ipcar, Dahlor Animal Hide and Seek. '47 32:290
- Kay, Helen How Smart Are Animals? 52:517
- Lewellen, John Farm Animals. '54 39:75
- Leyson, Captain Burr W. and Manecke, Ruth The Zoo Comes to You. '54 39:89
- Mannheim, Grete Farm Animals. '64 49:BC
- Mason, George F. Animal Clothing. '55 41:364
- Mason, George F. Animal Habits. 52:93-94
- Mason, George F. Animal Tools. '51 37:284
- Mason, George F. Animal Weapons. '49 33:380
- Merriam, Eve Small Fry. '65 49:498
- Morgan, Ann Haven Field Book of Animals in Winter. '39 24:179
- Morris, Johnny and Shackleton, Keith Animal Magic. '67 51:404
- Neurath, Marie Too Small to See. '56 44:155
- Palazzo, Tony and Fox, Robin A Passel of Possums and Other Farm Families. '68 52:518
- Pinier, Erna Curious Creatures. '53 39:89
- Podendorf, Illa Pets. '54 39:74
- Purcell, John Wallace The True Book of African Animals. '54 39:75
- Russell, Solveig Paulson Which Is Which? '66 52:98
- Sander, Lenore Animals That Work for Man. '63 49:BC
- Selsam, Millicent All About Eggs. '52 37:271
- Selsam, Millicent All Kinds of Babies and How They Grow. '53 37:290
- Selsam, Millicent E. How Animals Tell Time. '67 52:85
- Selsam, Millicent How the Animals Eat. '55 43:283
- Shaw, Margaret and Fisher, James Animals as Friends. '40 20:111
- Shuttlesworth, Dorothy Animal Camouflage. '66 52:101
- Thorne, Diana 101 Favorite Animals and Birds. '53 39:84
- Weil, Ann Animal Families. '46 31:115
- Workers of the WPA Federal Writers' Project in the City of New York. Who's Who in the Zoo. '38 23:112
- Wright, Helen and Rapport, Samuel Great Adventures with Animals. '67 52:86
- Zim, Herbert S. What's Inside of Animals? '53 37:291

c. General Zoology (Books for Adults)

- Borrdale, L. A. The Animal and Its Environment. 7:299
- Brown, Emerson C. My Animal Friends. 20:230
- Colbert, Edwin H. Evolution of the Vertebrates. '69 55:98
- Cutright, Paul Russel The Great Naturalists Explore South America. '40 25:295
- Ditmars, Raymond L. The Fight to Live. '38 23:56-57
- Ditmars, Raymond L. and Bridges, William Wild Animal World--Behind the Scenes of the Zoo. '37 21:260
- Dufresne, Frank Alaska's Animals and Fishes. '46 31:112
- Lyne, Gordon Marsupials and Monotremes of Australia. '68 52:507
- Pennak, Robert W. Collegiate Dictionary of Zoology. '64 52:517
- Poignant, Axel Animals of Australia. '67 51:406
- Seton, Ernest Thompson Wild Animals I Have Known. '45 32:47
- Shoosmith, F. H. Life in the Animal World. '38 24:358
- Vanden Eeckhoudt, P. Secret Life of Small Animals. '57:244
- Waddington, C. H. How Animals Develop. 52:89
- Willier, Benjamin H., Weiss, Paul A. and Hamburger, Viktor Analysis of Development. '55 39:247

d. Zoology — Invertebrates (Books for Children)

- Adrian, Mary Garden Spider. '51 37:144
 Adrian, Mary Honeybee. '52 37:276
 Blough, Glenn O. Discovering Insects. '67 52:506
 Conklin, Gladys I Like Butterflies. 53:176
 Earle, Olive L. Crickets. '56 41:362
 Fenton, Carroll Lane and Pallas, Dorothy Constance Insects and Their World. '56 43:375
 Frey, Nina A. Lasius, The Lucky Ant. '38 23:397
 Hogner, Dorothy Childs Earthworms. '53 39:78
 Hussey, Lois J. and Pessino, Catherine Collecting Cocoons. '53 39:78
 Kenly, Julie Closson Little Lives. '38 23:17
 Kenly, Julie Closson Voices from the Grass. 25:171
 King, Eleanor and Pressels, Wellmer Insect Allies. '38 23:57
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 Lane, Ferdinand C. All About the Insect World. '54 41:359-60
 Lewellen, John The True Story of Honeybees. '53 38:112
 Marcher, Marion W. Monarch Butterflies. '54 39:84
 McIntire, Alta Butterflies and Moths. '38 24:178
 McClung, Robert M. Green Darner. '56 41:363
 McClung, Robert M. Luna. '57 41:364
 McClung, Robert M. Sphinx. '49 33:379-80
 Podendorf, Illa The True Book of Insects. '54 39:74
 Politi, Leo The Butterflies Come. '57 43:278
 Potzger, J. E. and Whitney, Margaret Esther Insects and Some of Their Relatives. 52:507
 Rarig, Frances H. The Ant Queen's Home and Other Stories. '32 18:125
 Schatz, Albert and Riedman, Sarah R. The Story of Microbes. '52 39:90
 Sears, Paul McCutcheon Firefly. '56 43:377
 Selsam, Millicent E. Microbes at Work. '53 39:71
 Stepp, Ann A Silkworm Is Born. '72 57:243
 Teale, Edwin Way The Boys' Book of Insects. '39 24:298
 Tibbets, Albert B. The First Book of Bees. '52 38:113-14
 Verrill, A. Hyatt Strange Insects and Their Stories. '37 21:217
 Zarchy, Harry Butterflies and Moths. '66 52:83-84
 Zim, Herbert S. and Cottam, Clarence Insects. '51 36:199

d. Zoology — Invertebrates (Books for Adults)

- Bates, Marston The Natural History of Mosquitoes. '49 34:208
 Bayne, Jones, Stanhope Man and Microbes. '32 16:522
 Bisset, K. A. Bacteria. '52 38:314
 Buchsbaum, Ralph Animals Without Backbones. '38 23:232
 Buchsbaum, Ralph Animals Without Backbones. '48 34:335
 Carpenter A Naturalist in East Africa. 10:590
 Curran, C. H. Insects of the Pacific World. '45 30:246
 Dethier, Vincent G. Chemical Insect Attractants and Repellents. '47 32:226
 Duncan, Carl L. and Pickwell, Gayle The World of Insects. '39 26:111; 27:44
 Duncan, Winifred The Private Life of the Protozoa. '50 34:329
 Duncan, Winifred Webs in the Wind. '49 34:335
 Eltringham, H. Butterfly Lore. 8:531
 Flint, W. P. and Metcalf, C. L. Insects: Man's Chief Competitors. '32 17:343
 Friedlander, C. P. and Priest, D. A. Insects and Spiders. '56 42:95
 Gaul, Albion The Wonderful World of Insects. '53 38:248
 Hartnack, Hugo 202 Common Household Pests. '39 25:172-73
 Haskins, Caryl P. Of Ants and Men. '39 23:296
 Hegner, Robert Big Fleas Have Little Fleas. '38 22:379
 Hoogstraal, Harry Insects and Their Stories. '41 25:412
 Howard, L. O. The Insect Menace. '31 16:516-17
 Hutchins, Ross E. The Ant Realm. '67 51:406
 Imms, A. D. Insect Natural History. '51 36:311
 Imms, A. D. Social Behavior in Insects. '31 16:334

- Jahn, T. L. and Jahn, Frances F. How to Know the Protozoa. '50 34:325-26
 Jaques, H. E. How to Know the Insects. '36 22:159
 Kluyver, A. J. and Van Niel, C. B. The Microbe's Contribution to Biology. '56 41:258
 Lindauer, Martin Communication Among Social Bees. '71 56:571-72
 Morley, Derek Wragge The Evolution of an Insect Society. '55 41:245
 Nichols, David and Cooke, John A. L. The Oxford Book of Invertebrates. '71 56:434-35
 Oldroyd, Harold Insects and Their World. 52:517
 Osborn, Herbert Meadow and Pasture Insects. '39 25:297
 Patterson, J. T. and Stone, W. S. Evolution in the Genus Drosophila. '52 38:315
 Plath, Otto Emil Bumble Bees and Their Ways. '34 19:37
 Rendl, Georg The Way of a Bee. '33 19:38
 Richards, O. W. The Social Insects. '53 38:246
 Schwartz, George I. Life in a Drop of Water. '70 57:91-92
 Smith, Kenneth M. The Virus, Life's Enemy. '40 25:291
 Stromsten, Frank A. Davison's Mammalian. '47 32:227
 Sutherland, Louis The Life of the Queen Bee. '46 30:169
 Swain, Ralph B. The Insect Guide. '48 33:309
 Von Frisch, Karl Bees, Their Vision, Chemical Senses, and Language. '71 57:242
 Von Frisch, Karl The Dance Language and Orientation of Bees. '67 53:181
 Weed, Clarence M. Insect Ways. '30 16:174
 Wellhouse How Insects Live. 11:65
 Wichterman, Ralph The Biology of Paramecium. '53 38:315
 Insect Facts. '54 39:183
 Our Insect Friends and Foes and Spiders. '35 22:160

e. Zoology -- Reptiles and Amphibians (Books for Children)

- Adrian, Mary The American Alligator. '67 52:100
 Ballard, Lois The True Book of Reptiles. '57 41:368
 Bevans, Michael H. The Book of Reptiles and Amphibians. '56 43:283
 Bronson, Wilfred S. Turtles. '45 30:179
 Chenery, Janet The Toad Hunt. '67 52:88
 Collins, Henry Hill, Jr. Turtles. '62 51:414
 Ditmars, Raymond L. The Book of Living Reptiles. '36 22:50
 Harris, Louise Dyer and Harris, Norman Dyer Slim Green. '55 43:83
 Hogner, Dorothy Childs A Book of Snakes. '66 52:102
 Hogner, Dorothy Childs Frogs and Polliwags. '56 43:83
 Hoke, John The First Book of Snakes. '52 38:114
 Leutscher, Alfred The Curious Snakes of the World. '65 50:96
 McClung, Robert M. Black Jack: Last of the Big Alligators. '67 52:94
 Morris, Percy A. Boy's Book of Frogs, Toads, and Salamanders. '57 41:368
 Sears, Paul McCutcheon Tree Frog. '54 43:377
 Staff of the Federal Writers' Project, Works Progress Administration in the City of New York Reptiles and Amphibians. '39 24:178
 Zim, Herbert S. Alligators and Crocodiles. '52 37:270-71
 Zim, Herbert S. Frogs and Toads. '50 34:266-67
 Zim, Herbert S. Snakes. '49 33:380
 Zim, Herbert S. and Smith, Hobart M. Reptiles and Amphibians. '54 39:69

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- Bragg, Arthur N., Weese, A. O., Dundee, Harold A., Fisher, Helen Talley, Richards, A. and Clark, Carol Berghold Researches on the Amphibia of Oklahoma. '50 34:329
 Conant, Roger and Bridges, William. What Snake Is That? '39 24:414
 Curran, C. H. and Kauffeld, Carl Snakes and Their Ways. '37 22:161
 Ditmars, Raymond L. North American Snakes. '39 24:413
 Ditmars, Raymond L. Reptiles of the World. '33 18:53
 Pope, Clifford H. Amphibians and Reptiles of the Chicago Area. '44 29:279
 Pope, Clifford H. The Reptile World. '55 41:244
 Pope, Clifford Snakes Alive and How They Live. '37 22:214
 Savage, Jay M. Lizards, Snakes and Turtles of the Western U.S. and Canada. '49 34:270

Verrill, A. Hyatt Strange Reptiles and Their Stories. '37 22:209
Wright, A. A. and Wright, A. H. Handbook of Frogs and Toads. '33 19:138-39

Wright, Albert Hazen and Wright, Anna Allen Handbook of Frogs and Toads of the United States and Canada. '49 33:309

f. Zoology -- Aquatic Animals (Books for Children)

Andrews, Roy Chapman All About Whales. '54 41:359
Adrian, Mary Fiddler Crab. '53 39:84
Beaty, John Y. The Ocean Book. '46 31:119
Broekel, Ray The True Book of Tropical Fishes. '56 41:366
Buehr, Walter Harvest of the Sea. '55 41:364
Darling, Louis Seals and Walruses. '55 41:363
Dudley, Ruth H. Sea Shells. '53 39:78
Earle, Olive L. The Octopus. '55 41:361-62
Engleman, F. E., Salmon, Julia and McKenny, Wilma Scales and Fins. '38 27:48
Goudey, Alice E. Here Come the Whales. '56 43:278
Hanson, S. E. G. and Wells, Marjorie E. Ponds, Pools, and Puddles. '40 25:175
Lane, Ferdinand C. All About the Sea. 41:360
McClung, Robert M. Horseshoe Crab. '67 52:94

McClung, Robert M. Leaper. '57 41:364
Mellen, Ida M. Twenty Little Fishes. '42 27:49
Morgan, Alfred An Aquarium Book for Boys and Girls. '36 22:101
Phleger, Fred Red Tag Comes Back. '61 48:200
Podendorf, Illa The True Book of Animals of the Sea and Shore. '56 41:367
Porter, Walter P. and Hansen, Einar A. The Pond Book. '36 22:275
Selsam, Millicent and Morrow, Betty See Through the Sea. '55 43:375-76
Street, Philip Between the Tides. '53 38:245
Wells, Harrington Seashore Life. '37 22:163
Zim, Herbert S. The Great Whales. '51 36:199-200
Zim, Herbert S. and Ingle, Lester Sea-shores. '55 40:244
Zim, Herbert S. and Shoemaker, Hurst S. Fishes. '56 41:343

f. Zoology -- Aquatic Animals (Books for Adults)

Abbott, R. Tucker How to Know the American Marine Shells. 52:80
Borgeson, Griffith and Lillian Home Aquarium Handbook. '57 41:344
Brown, Alison Leadley Ecology of Fresh Water. '71 56:282-83
Brown, E. S. Life in Fresh Water. '56 41:344
Coates, Christopher W. Tropical Fishes as Pets. '33 18:197
Cousteau, Jacques-Yves and Dirole, Philippe Life and Death in a Coral Sea. '71 57:89-90
Curtis, Brian The Life Story of the Fish. '38 24:358
Firth, Frank E. The Encyclopedia of Marine Resources. 54:392
Godfrey, Joe, Jr. Fresh Water Fish: Salt Water Fish. 33:304
Johnson, Myrtle E. and Snook, Harry J. Sea Shore Animals of the Pacific Coast. 12:453

McClintock, Theodore The Under Water Zoo. '38 23:57
Mellanby, Helen and Eastham, L. E. S. Animal Life in Fresh Water. '38 24:236
National Geographic Society (Edited by LaGorce, John Oliver) The Book of Fishes. '39 25:410
Nichols, John T. and Bartsch, Paul Fishes and Shells of the Pacific World. '45 30:246
Perry, Louise M. and Schwengel, Jeanne S. Shells of the West Coast of Florida. '55 41:250-51
Richards, Horace G. Animals of the Seashore. '38 23:355
Smith, B. Webster The World Under the Sea. '40 25:178
Verrill, A. Hyatt Wonder Creatures of the Sea. '40 25:178

g. Zoology — Birds (Books for Children)

- Allen, Arthur A. The Golden Plover and Other Birds. '39 23:231
- Ashbrook, Frank G. The Blue Book of Birds of America; The Red Book of Birds of America; The Green Book of Birds of America. '31 18:126
- Ashbrook, Frank G. The Blue Book of Birds of North America. The Green Book of Birds of North America. The Red Book of Birds of America. The Yellow Book of Birds of America. '46 33:304
- Bayne, C. S. Getting to Know the Birds. '44 30:54
- Beecher, W. J. A Child's Book of Birds. '68 52:511
- Boulton, Rudyerd Traveling with the Birds. '33 20:187; 31:116
- Coevering, Jack Van Real Boys and Girls Go Birding. '39 24:180
- Crosby, Alexander L. Canada Geese. '66 51:104
- Darling, Louis Penguins. '56 41:363
- Dilger, William C. Finding Out About Birds. '67 52:505
- Earle, Olive L. Birds and Their Nests. '52 37:276
- Earle, Olive L. Birds of the Crow Family. 52:95
- Earle, Olive L. Robins in the Nest. '53 37:292
- Earle, Olive L. The Swans of Willow Pond. '55 41:362
- Evans, Edna H. Bill and the Bird Sander. '40 26:111; 27:44
- Fenton, Carroll Lane and Pallas, Dorothy Constance Birds and Their World. '51 39:87
- Friskey, Margaret Birds We Know. '54 39:77
- Garellick, May What's Inside? '55 43:281
- Hartmann, Newton H. Queer Birds. '34 20:87
- Henry Marguerite Birds at Home. 31:117
- Hiser, Iona Seibert From Scales to Fancy Feathers. 52:91-92
- Hutchins, Ross E. The Last Trumpeters. '67 52:91
- Kaufmann, John Fishhawk. '67 52:97
- Kenly, Julie Closson Wild Wings. '33 18:56
- King, Julius Birds. Books I, II, and III. '34 20:235
- Lemmon, Robert S. The Birds Are Yours. '51 37:275
- Lewellen, John Birds and Planes: How They Fly. '53 38:111
- McClung, Robert M. Red Bird. '68 52:506
- McClung, Robert M. Ruby Throat. '50 34:267
- McClung, Robert M. Vulcan: The Story of a Bald Eagle. '55 41:363
- McClung, Robert M. Whooping Crane. 52:94
- McIlhenny, E. A. The Autobiography of an Egret. '39 25:175
- Munn, Ian Johnny and the Birds. '55 41:351
- Pierce, Georgia Junior Science Book of Bird Life. '67 52:509-10
- Pistorius, Anna What Bird Is It? '45 30:179
- Potzger, J. E. and Friesner, Gladys M. Birds: Book One; Birds: Book Two; Birds: Book Three. 52:507
- Ripper, Charles L. Diving Birds. '67 52:95-96
- Ripper, Charles L. Hawks. '56 41:364
- Roberts, Thomas Sadler Bird Portraits in Color. '34 20:188
- Roberts, Thomas Sadler Two Hundred Ninety-Five American Birds. '36 20:188
- Sears, Paul McCutcheon Barn Swallow. '55 41:352
- Selsam, Millicent E. Egg to Chicks. '46 31:116
- Shankland, Frank North and Peat, Fern Bise! Birds. '32 18:198
- Verrill, A. Hyatt Strange Birds and Their Stories. '38 23:355
- Wheeler, Ruth Lellah The Story of Birds of North America. '65 52:80-81
- Williamson, Margaret The First Book of Birds. '51 38:114-15
- Zim, Herbert S. Homing Pigeons. '49 33:303
- Zim, Herbert S. Owls. '50 34:266
- Zim, Herbert S. Parakeets. '53 39:69
- Zim, Herbert S. and Gabrielson, Ira N. Birds. '49 37:270

g. Zoology — Birds (Books for Adults)

- Allen, Arthur A. American Bird Biographies. '35 19:139
- Bent, Arthur Cleveland Life Histories of North American Fowl: Ducks, Geese, and Swans. Vols. I and II. 39:184

- Burgess, Thornton W. Birds You Should Know. '33 18:189
- Byers, Emma F. Out of Doors with Birds. 24:358
- Coble, Mary F. and Life, Cora S. Introduction to Ornithological Nomenclature. '32 17:81
- Collins, Henry H., Jr. Birds of Montezuma Castle and Tuzigoot National Monuments. '51 35:302
- Dubkin, Leonard The Murmur of Wings. '44 30:246
- Dugdale, Vera Album of North American Birds. '67 52:92
- Dupuy, Wm. Atherton Our Bird Friends and Foes. '40 25:177
- Griscom, Ludlow Modern Bird Study. '45 30:256
- Grosvenor, Gilbert and Wetmore, Alexander The Book of Birds. Vols. I and II. '37 22:33
- Hausman, Leon Augustus The Bird Book. '55 41:343
- Hausman, Leon Augustus Birds of Prey of Northeastern North America. '48 32:222
- Henderson, Junius The Practical Value of Birds. 12:493
- Herrick, Francis Hobart Wild Birds at Home. '35 19:137-38
- Lincoln, Frederick The Migration of American Birds. '39 24:180
- National Geographic Society The Book of Birds. Vols. 1 and 2. '39 25:410
- Nice, Margaret Morse The Watcher of the Nest. '39 27:47
- Palmer, E. Laurence Aids to Knowing Natural Science. The Birds. '44 30:178
- Peterson, Alvin M. Wild Bird Neighbors. '40 26:111; 27:44
- Pettingill, Olin Sewall, Jr. A Guide to Bird Finding West of the Mississippi. '53 38:250
- Rowan, William The Riddle of Migration. '31 17:77
- Sutton, George Miksch Birds in the Wilderness. Adventures of an Ornithologist. '36 22:275
- Walter, H. E. and A. H. Wild Birds in City Parks. 11:138
- Wing, Leonard W. Natural History of Birds. '56 41:343
- Birds of the World. '38 23:237-38

h. Zoology — Mammals (Books for Children)

- Adrian, Mary Gray Squirrel. '55 43:376-77
- Ashbrook, Frank G. Furry Friends. '30 20:231
- Barry, Robert Animals Around the World. '67 52:79-80
- Berrill, Jacquelyn Wonders of the Monkey World. '67 52:91
- Breeden, Stanley and Kay The Life of the Kangaroo. '67 51:406
- Bronson, Wilfrid S. The Chisel-Tooth Tribe. '39 24:179
- Bronson, Wilfrid S. Coyotes. '46 31:109
- Brown, Margaret Wise Young Kangaroo. '55 43:280
- Burns, William A. Horses and Their Ancestors. '54 41:347
- Davis, George An Animal Tour. '46 31:107
- Davis, Joseph A. Finding Out About Mammals. '67 52:505-06
- Earle, Olive L. Camels and Llamas. '61 52:95
- Earle, Olive L. Mice at Home and Afield. '57 41:362
- Goudey, Alice E. Here Come the Bears. '54 39:88
- Goudey, Alice E. Here Come the Deer. '55 43:278
- Hogner, Dorothy The Cat Family. '56 43:84
- Hornblow, Leonora and Arthur Animals Do the Strangest Things. '64 49:498
- Hoyt, Vance Joseph Zorra: The Biography of a Gray Fox. '33 21:49
- Humphreys, Dena The Big Book of Animals. 39:85
- Kelway, Phyllis The Otter Book '45 31:116
- Kelway, Phyllis The Squirrel Book. '44 31:115
- Lauber, Patricia The Story of Dogs. '66 51:104
- Lindquist, Willis Animals from All Over the World. '56 41:356
- Lippincott, Joseph Wharton Persimmon Jim: The Possum. '55 44:64
- Mason, George F. The Deer Family. '62 52:93
- McClung, Robert M. Major: The Story of a Black Bear. '56 41:363-64
- Neurath, Marie The Wonder World of Animals. 38:115
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- Thorne, Diana Dogs; Baby Animals. '32 18 98
- Verri, A. Hyatt Strange Animals and Their Stories. '39 24:118
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- Werner, Jane Animal Friends. '53 39: 68
- Williams, Garth Baby Animals. '56 41: 355
- Williamson, Margaret The First Book of Mammals. '57 43:280
- Zim, Herbert S. The Big Cats. '55 41: 360
- Zim, Herbert S. Elephants. '46 31: 106
- Zim, Herbert S. Golden Hamsters. '51 36:200
- Zim, Herbert S. Monkeys. '55 41:360-61
- Zim, Herbert S. Rabbits. '48 32: 294
- Zim, Herbert S. and Hoffmeister, Donald F. Mammals. '55 40:244

h. Zoology — Mammals (Books for Adults)

- Anderson, Sydney and Jones, J. Knox, Jr. (Editors) Recent Mammals of the World: A Synopsis of Families. '67 52:517
- Bailey, John Wendell The Mammals of Virginia. '46 32:222-23
- Gunderson, Harvey L. and Beer, James L. The Mammals of Minnesota. '53 38: 324
- Hamilton, W. J., Jr. American Mammals. '39 24:409
- Ingles, Lloyd Glenn Mammals of California. '47 32:47
- McCay, Clive M. Nutrition of the Dog. '49 34:206
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- Palmer, Ralph S. The Mammal Guide. '54 39:253
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- Wells, Eric F. V. Lions--Wild and Friendly. '34 18:280
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- Ben Meyr, Berl Your Own True Story. '40 25:177
- Bibby, Cyril How Life Is Handed On. '47 34:275
- Butterfield, Frances W. From Little Acorns: The Story of Your Body. '51 37:148
- Cheesman, Evelyn The Growth of Living Things. '32 17:260; 17:347
- Eisenberg, Philip and Miriam The Brave Gives Blood. '54 39:76
- Froman, Robert The Many Human Senses. '66 51:414
- Gamow, George Mr. Tompkins Learns the Facts of Life. '54 39:244
- Gilbert, Margaret Shea Biography of the Unborn. '38 23:294
- Boldin, Augusta Straight Hair, Curly Hair. '66 52:102
- Gruenberg, Sidonie M. The Wonderful Story of How You Were Born. '52 37:290
- Guttmacher, Alan Frank Life in the Making. '33 18:198
- Novikoff, Alex From Head to Foot, Our Bodies and How They Work. '46 32: 221-22
- Pemberton, Lois The Stork Didn't Bring You. '48 34:275
- Perry, John Our Wonderful Eyes. '55 43:282
- Schneider, Herman and Nina How Your Body Works. '49 33:320
- Schweinitz, Karl De Growing Up. '53 39:82
- Wright, Helena The Story of Sex. '32 17:162
- Zim, Herbert S. Blood. '68 52:506
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38:316
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52:514
- Boos, William F. The Poison Trail.
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- Boyd, William An Introduction to Medi-
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- Causey, David Uninvited Guests. '32
16:432
- Dent, John Yerbury The Human Machine.
'37 21:219
- Donnison, C. P. Civilization and
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- Erb, Russel C. The Common Scents of
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- Estabrooks, G. H. Man, the Mechanical
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- Fishbein, Morris Frontiers of Medicine.
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- Geldard, Frank A. The Human Senses.
'53 39:253
- Harrison, R. J. The Child Unborn. '51
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- Henderson, Yandell Adventures in Res-
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- Hoerr, Normond L. and Osol, Arthur (Edi-
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- Hoskins, R. G. The Tides of Life. '33
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- Menkin, Vally Dynamics of Inflammation.
'40 25:296
- Moncrief, R. W. The Chemical Senses.
'46 31:38
- Potter, Edith L. Fundamentals of Human
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- Reidman, Sarah R. Your Blood and You.
'52 38:182
- Rosebury, Theodor Experimental Air-
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- Seeman, Bernard Your Sight. '68 52:
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- Wilson, Netta W. and Weisman, S. A.
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- Wright, W. D. The Perception of Light.
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- Boyer, Samuel H., IV. Papers on Human
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- Cook, Robert C. and Burks, Barbara S.
How Heridity Builds Our Lives. '46
30:324
- Dunn, L. C. Genetics in the 20th Century.
'51 35:302
- Glass, Bentley Genes and the Man. '43
28:55
- Goldschmidt, Richard B. Understanding
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- Goldstein, Philip Genetics Is Easy.
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- Hurst, C. C. Heridity and the Ascent
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- Muller, H. J., Little, C. C. and Snyder,
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- Osborn, Frederick Preface to Eugenics.
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- Paterson, D. Applied Genetics. '69
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- Watson, James D. Molecular Biology of
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41:360
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- Brown, Stanley B. and Brown, Barbara M.
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- Clark, Mary Lou The True Book of Dinosaurs. '55 41:350
- Darling, Lois and Louis Before and After the Dinosaurs. 52:97
- Dickinson, Alice The First Book of Prehistoric Animals. '54 39:73
- Ditmars, Raymond L. and Carter, Helene Prehistoric Animals. '34 20:187
- Fenton, Carroll Lane Life Long Ago. '37 22:217
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- Froman, Robert Billions of Years of You. '67 52:83
- Holden, Raymond Famous Fossil Finds. '66 52:91
- Johnson, Gaylord How Father Time Changes the Animals' Shapes. '39 27:4d
- Novikoff, Alex Climbing Our Family Tree. '45 30:179
- Robinson, W. W. Beasts of the Tar Pits. '32 17:257
- Scheele, William E. The First Mammals. '55 41:344
- Verrill, A. Hyatt Strange Prehistoric Animals and Their Stories. '48 32:375
- Whitnall, Harold O. A Parade of Ancient Animals. '36 21:171
- Wyler, Rose and Ames, Gerald Life on the Earth. '53 38:243
- Zim, Herbert S. Dinosaurs. '54 39:70

k. Paleontology and Evolution (Books for Adults)

- Andrews, Roy Chapman Meet Your Ancestors. '45 30:99-101
- Beutner, R. Life's Beginning on the Earth. '38 23:294
- Blum, Harold F. Time's Arrow and Evolution. 52:89
- Bradley, John Hodgdon, Jr. Parade of the Living. '30 16:83-84
- Cain, A. J. Animal Species and Their Evolution. 52:90
- Clark, Austin H. The New Evolution: Zoogenesis. '30 14:660
- Colbert, Edward H. The Dinosaur Book. '45 30:249
- Fenton, Carroll L. The World of Fossils. '33 19:37
- Goldschmidt, Richard The Material Basis of Evolution. '40 24:407
- Grimes, Charles W. A Story Outline of Evolution. '45 30:53
- Gruenberg, Benjamin C. The Story of Evolution. '29 14:572
- Haldane, J. B. S. The Causes of Evolution. 17:253
- Hooton, Earnest A. Up from the Ape. '31 16:251-52
- Keith, Sir Arthur A New Theory of Human Evolution. '49 34:337
- Knight, Charles R. Life Through the Ages. '46 30:165
- Leakey, L. S. B. Adam's Ancestors. '35 20:230
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- Morgan, Thomas Hunt The Scientific Basis of Evolution. '32 17:77
- Newman, The Gist of Evolution. 11:61
- Newman, Horatio Hackett Evolution Yesterday and Today. '32 16:521-22
- Raymond, Percy A. Prehistoric Life. '39 24:297
- Romer, Alfred Sherwood Man and the Vertebrates. '55 41:251
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- Ross, Herbert H. A Synthesis of Evolutionary Theory. 52:516
- Seers, A. Waddingham The Earth and Its Life. 6:569
- Shimer, Hervev Woodburn An Introduction to the Study of Fossils. '33 19:86
- Stewart, George R. Man: An Autobiography. '46 31:35
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- White, M. J. O. Animal Cytology and Evolution. '45 32:55
- Willey, Arthur Lectures on Darwinism. '30 16:342

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- Disraeli, Robert Seeing the Unseen. '33 18:28
- Jaques, H. E. Living Things How to Know Them. '39 23:395
- Schwartz, Julius Through the Magnifying Glass. '54 40:243
- Snyder, J. Rossiter Creatures Great and Small. '35 20:188
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- Ball, Eric G. *Biochemical Preparations* Volume 2. '38:315
- Bastock, Margaret *Courtship: An Ethological Study*. '67 53:175
- Bonner, John Tayler *Cells and Society*. '55 41:245
- Bradley, John Hodgdon *Patterns of Survival*. '38 22:377
- Clement, A. G. *Living Things*. 11:216
- Croll, N. A. *Ecology of Parasites*. '66 52:511
- East, Edward M. (Editor) *Biology in Human Affairs*. '31 16:82-83
- Gerard, R. W. *Unresting Cells*. '40 25:236
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- Gray, Peter (Editor) *Encyclopedia of the Biological Sciences*. '70 55:102
- Harvey, E. Newton *Living Light*. '40 25:410
- Hill, A. V. *Adventures in Biophysics*. '31 15:274
- Holmes, S. J. *Organic Form and Related Biological Problems*. '48 32:224
- Huxley, Julian S. *Problems of Relative Growth*. '32 17:249
- Jennings, H. S. *The Biological Basis of Human Nature*. '30 17:347
- Kellogg, W. N. and Kellogg, L. A. *The Ape and the Child*. '33 19:88
- Knobloch, Irving William *Readings in Biological Science*. '48 32:376
- Koppanyi, Theodore *The Conquest of Life*. '30 15:74
- Mainx, Felix *Foundations of Biology*. '55 40:163
- Mailisoff, William M. *Dictionary of Biochemistry and Related Subjects*. '43 28:296
- Needham, Joseph *Order and Life*. '68 53:179
- Pearl, Raymond *The Natural History of Population*. '39 23:229-30
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- Sheard, Charles *Life-Giving Light*. '33 17:344
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- Thomson, J. A. *Everyday Biology*. 9:67
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- Wells, H. G., Huxley, Julian S. and Wells, G. P. *The Science of Life*. '34 20:188
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- Watson-Baker, W. *World Beneath the Microscope*. '35 20:187

m. Conservation (Books for Children)

- Blough, Glenn O. *Lookout for the Forest*. '55 40:242-43
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- Bruere, Martha Bensley *Your Forests*. '45 30:108
- Curtis, Mary I. *Conservation in America*. '47 33:310
- Evers, Alf *The Treasure of Watchdog Mountain*. '55 43:377
- Hazen, Barbara *Please Protect the Porcupine*. '67 52:84
- Johnson, James Ralph *The Last Passenger*. '56 43:377-78
- Lathrop, Dorothy P. *Let Them Live*. '51 37:292
- Pack, Charles Lathrop and Gill, Tom *Forest Facts for School*. '31 17:350
- Shuttlesworth, Dorothy E. *The Wildlife of South America*. '66 52:99
- Smith, F. C. *The First Book of Conservation*. '54 39:73; 43:287
- Tchaika, Florence *Trouble at Beaver Dam*. '53 39:76
- Webber, Irma E. *Thanks to Trees*. '52 37:277
- Trees for Tomorrow*. '47 32:47
- The Wonder of Water*. '57 44:155

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- Adelstein, Michael E. and Pival, Jean G. *Ecocide and Population*. '72 57:246
- Baer, Marian E. *Pandora's Box. The Story of Conservation*. '39 24:180
- Beard, Daniel *Fading Trails*. '42 27:49-50
- Caldwell, Lynton Keith *Environment, A Challenge to Modern Society*. '70 56:569

- Callison, Charles H. (Editor) *America's Natural Resources*. '67 52:517
- Carskadon, Thomas R. and Modley, Rudolf U.S.A.: Measure of a Nation. '49 33:314
- Chase, Stuart Rich Land, Poor Land. '36 21:167
- Cocannouer, Joseph A. Tramping Out the Vintage. '45 30:162
- Dewhurst, J. Frederick and Associates *America's Needs and Resources*. '47 33:72-76
- Fanning, Leonard M. Our Oil Resources. '45 30:312
- Faulkner, Edward H. A Second Look. '47 33:166
- Fitzpatrick, Frederick L. The Control of Organisms. '40 25:175
- Flawn, Peter T. Environmental Geology: Conservation, Land-Use Planning, and Resource Management. '70 56:567-68
- Frasier, Dean The People Problem. '71 57:104
- Fuchs, Walter M. When the Oil Wells Run Dry. '46 32:52
- Gabrielson, Ira N. Wildlife Conservation. 52:514
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- Gaer, Joseph Men and Trees. '39 25:173
- Gifford, John C. Living by the Land. '45 30:305-06
- Glover, Katherine *America Begins Again*. '39 23:293-94
- Gustafson, A. F., Ries, H., Guise, C. H. and Hamilton, W. J., Jr. Conservation in the United States. '39 23:293
- Hazard, Joseph T. Our Living Forests. '48 33:79
- Martin, Alexander C. Botany and Our Social Economy. '48 32:293
- Mather, Kirtley F. Enough and to Spare. '44 29:219
- McCluney, William Ross (Editor) What You Can Do to Stop the Environmental Destruction of South Florida. '71 56:576-78
- Mitchell, Luch Sprague, Bowman, Eleanor and Phelps, Mary My Country 'Tis of Thee. '40 25:354
- Murdoch, W. W. Environment, Resources, Pollution, and Society. '71 56:579-82
- National Wildlife Federation A Desert in Your Own Backyard. 38:249
- Osborn, F. This Plundered Planet. '48 33:166
- Parkins, A. E. and Whitaker, J. R. (Editors) *Our Natural Resources and Their Conservation*. '36 21:54
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- Pearson, Frank A. and Harper, Floyd A. The World's Hunger. '45 33:166
- Perry, John Our Polluted World: Can Man Survive? '67 55:259
- Pfeiffer, Ehrenfried The Earth's Face and Human Destiny. '47 33:166
- Popkin, Roy The Environmental Science Services Administration. '67 53:179
- Pryor, William Clayton and Pryor, Helen S. Water--Wealth or Waste. '39 24:413
- Reed, W. Maxwell *America's Treasure*. '39 24:413
- Rosin, Jacob and Eastman, Max The Road to Abundance. '53 38:247
- Russell, Sir E. J. Lessons on Soil. '50 34:329
- Sears, Paul B. Deserts on the March. '35 22:209
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- Sears, Paul B. Life and Environment. '39 24:55
- Smith, Guy Harold (Editor) *Conservation of the Natural Resources*. '50 34:340-41
- Strobbe, Maurice A. Understanding Environmental Pollution. '71 56:578
- Sutman, Francis X. (Editor) What Kind of Environment Will Our Children Have? '71 56:574-75
- Troost, Cornelius J. and Altman, Harold *Environmental Education: A Sourcebook*. '72 57:108
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- Vogt, W. Road to Survival. '48 33:166
- Whitaker, Joe Russell The Life and Death of the Land. '46 33:76-77
- Wing, Leonard W. Practice of Wildlife Conservation. '65 51:417
- Winn, Ira J. Basic Issues in Environment. '72 57:107
- World Meteorological Organization, Geneva, Switzerland A Brief Survey of the Activities of the World Meteorological Organization Relating to the Human Environment. '70 56:438
- Zimmerman, O. T. and Lavine, Irwin DDT, Killer of Killers. '46 31:41
- The Explorer Naturalist (Journal of the Amateur Naturalists Association) 34:270

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Alexander, William P. and Cormack, Mari-
belle Bruce and Marcia, Woodsmen.
'39 23:293

Andrews, Roy Chapman This Amazing
Planet. '40 25:235

- Athey, Lillian Cox Along Nature's Trails. '36 21:115
- Bell, Thelma Harrington and Bell, Corydon Nature Paint Book. '33 21:115
- Berrill, Jacquelyn Wonders of the Woodland Animals. '53 38:109
- Blough, Glenn O. Soon After September. '59 49:96
- Buck, Margaret Waring In Woods and Fields. '50 34:268; 38:110
- Butler, Mary C. Happy Nature Adventurers. '37 22:217
- Carr, William H. The Stir of Nature. '30 17:166
- Doane, Pelagie A Book of Nature. '52 38:107-08
- Epple, Anne Orth Nature Quiz Book. '54 41:352
- Fenton, Carroll Lane Wild Folk at the Pond. '48 32:378-79
- Fox, Charles Philip When Spring Comes. '64 49:8C
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- Fuller, Raymond T. Along the Brook. '31 18:125
- Furbay, John Harvey Curious Habits of Our Common Birds, Animals, and Plants. '35 20:182
- Gaul, Albro The Pond Book. '55 44:64
- Goetz, Delia Grasslands. 52:97
- Goetz, Delia Tropical Rain Forests. '57 41:362-63
- Huntington, Harriet E. Let's Go Outdoors. '39 24:180
- Hylander, C. J. Out of Doors in Spring. '42 27:49
- Hylander, Clarence J. The Year Round. '32 18:126
- Kane, Henry B. The Tale of the Wild Goose; The Tale of the Bullfrog. '46 31:108
- Kenly, Julie Closson Children of a Star. '32 17:259
- Low, A. M. Tick-Tock, a Journey into the Wonderland of Science. '46 30:245
- Lubell, Winifred and Cecil In a Running Brook. '68 52:507
- Mann, Paul B. and Hastings, George T. Out of Doors. '32 17:247
- Mitchell, Lucy Sprague Guess What's in the Grass. '45 30:180
- Parker, Bertha Morris Spring Is Here; Summer Is Here; Fall Is Here; Winter Is Here. '48 33:303
- Patch, Edith M. Holiday Hill. '31 16:433-34
- Patch, Edith Marion Holiday Meadow. '35 20:114
- Patch, Edith Marion Holiday Pond. '35 20:114-15
- Patch, Edith M. and Fenton, Carroll L. Desert Neighbors. '37 22:329
- Patch, Edith M. and Fenton, C. L. Forest Neighbors. '38 23:57
- Patch, Edith H. and Fenton, Carroll Lane Holiday Shore. '35 19:137
- Peattie, Donald Culross The Rainbow Book of Nature. '57 41:368
- Porter, Walter P. and Hansen, Einar A. Fields and Fencerows. '37 22:275
- Ransom, Elmer The Woodland Book. '45 31:108
- Schoenherr, John The Barn. '68 52:512
- Selsam, Millicent See Through the Forest. '56 43:376
- Selsam, Millicent See Through the Jungle. '57 43:376
- Shuttlesworth, Dorothy E. The Wild Life of Australia and New Zealand. '67 52:100
- Sterling, Dorothy Fall Is Here. '66 52:101
- Von Hagen, Victor South American Zoo. '46 31:112
- Werner, Jane and the Staff of the Walt Disney Studio Walt Disney's Living Desert. '54 41:357
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- True Nature Series Animals of the Woods; Gray Squirrel; Snapping Turtle; Water Birds; Black Bear Twins; Three Little Kittens; Pride, the Saddle Horse; Shep, the Farm Dog; Goats and Kids; Bunny Rabbit; Animals on the Farm; and Elephants. '46 31:106

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- Devoe, Alan Down to Earth. '40 25:176
- Fisher, G. Clyde (Editor) Nature's Secrets. 21:211
- Fuller, Raymond T. The Doorway to Nature. '31 18:188
- Furbay, John Harvey Nature Chats--A Year Out-of-Doors. '34 19:137
- Hawkes, Clarence Notes of a Naturalist. '38 23:57
- Jordan, E. L. Hammond's Nature Atlas of America. '52 38:102-03
- McCreery, James L. Exploring the Earth and Its Life in a Natural History Museum. '33 18:258
- Medsgger, Oliver P. Nature Rambles: Summer; Nature Rambles: Autumn. '32 17:166
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Palmer, E. Laurence. Fieldbook of Natural History. '49 33:309
 Peterson, Roger Tory. Wildlife in Color. '51 38:107
 Pimental, Richard A. Natural History. '63 52:518
 Royston, H. R. The Unity of Life. 12:354

Thomson, Sir J. Arthur. The Outline of Natural History. '31 16:431
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 Woods, Robert S. The Naturalist's Lexicon. '44 30:101

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Buehr, Walter. The Magic of Paper. '66 52:96
 Chamberlain, James F. How We Are Clothed. 8:375
 Darling, Louis. Chickens and How to Raise Them. '55 41:363
 Duncan, Marion. On the Farm. '40 25:171
 Gringhuis, Dirk. Of Cabbages and Cattle. '62 51:415
 Hollos, Clara. The Story of Your Bread. '49 33:305
 Perry, Josephine. Fish Production. '40 25:175
 Perry, Josephine. The Paper Industry. '46 30:254

Perry, Josephine and Slauson, Cleste. Forestry and Lumbering. '39 24:413
 Petersham, Maud and Miska. The Story Book of Clothes. '33 21:117
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 Rogers, Matilla. The First Book of Cotton. '54 39:74
 Schloat, G. Warren, Jr. The Wonderful Egg. '52 37:272
 Wall, Gertrude Wallace. Gifts from the Forest. '52 39:176
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 Zim, Herbert S. Your Food and You. '57 41:361

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Bendure, Zelma and Pfeiffer, Gladys. America's Fabrics. '46 30:319
 Blumenthal, Saul. Food Products. '47 32:52
 Brunner, Edmund de S., Sanders, Irwin T. and Ensminger, Douglas. Farmers of the World: The Development of Agricultural Extension. '45 30:109
 Clark, William H. Farms and Farmers. '45 30:109-10
 Eberle, Irmengarde. Basketful: The Story of Our Foods. '46 30:307-08
 Ellis, Rhoda. Dictionary of Dietetics. '56 42:95
 Furnas, C. C. and Furnas, S. M. Man, Bread and Destiny. '37 22:375
 Fraser, Samuel. American Fruits. '27 12:567
 Harrow, Benjamin. Vitamines. 6:344
 Hinman, Robert B. and Harris, Robert B. The Story of Meat. '39 25:355
 Hutchinson, J. B., Silow, R. A. and Stephens, S. G. The Evolution of Gossypium and the Differentiation of the Cultivated Cottons. '47 32:225-26
 Johnson, Sherman E. and Associates. Managing a Farm. '46 30:306
 Kellogg, Charles E. The Soils that Support Us. '41 26:56
 Lampert, L. M. Milk and Dairy Products. '47 32:225

Leggett, Wm. F. The Story of Linen. '45 30:54
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 McCance, R. A. and Widdowson, E. M. The Chemical Composition of Foods. '47 32:51-52
 Phillips, A. J. Gardening Without Soil. '40 25:57
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 Russell, James E. Heredity in Dairy Cattle. '44 29:217
 Sherman, Henry C. Chemistry of Food and Nutrition. '32 16:523-24
 Sherman, Henry C. Food and Health. '34 21:55
 Sherman, Henry C. Food Products. '35 21:55
 Shinkle, John H. Textile Testing. '40 25:294
 Strong, John H. Fabric Structure. '47 32:52
 Tressler, Donald K. Marine Products of Commerce. 8:533
 Worthen, Edmund L. Farm Soils: Their Management and Fertilization. '48 33:80
 Zon, Raphael. Forests and Water in the Light of Scientific Investigation. 12:568

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Proceedings of the Auburn Conference on
the Use of Radioactive Isotopes in
Agricultural Research. '48 34:206

2. Physical Sciences and Applications

Note: Listings in each of the following categories
are divided into: (1) Books for Children
(2) Books for Adults

a. General Physical Science (Books for Children)

Bendick, Jeanne How Much and How Many.
'47 37:145
Bragdon, Lillian J. Tell Me the Time,
Please. '36 21:51
David, Eugene Crystal Magic. '65 49:
498
Ilin, M. What Time Is It? '32
17:349

Lord, Eugene Hodgdon Experimenting at
Home with the Wonders of Science.
'40 25:170-71
Schlein, Miriam It's About Time. '55
43:281
Watson, Jane Werner How to Tell Time.
'57 41:354
Ziner, Feenie and Thompson, Elizabeth
The True Book of Time. '56 41:368

a. General Physical Science (Books for Adults)

Adler, Irving The Secret of Light. '52
39:176
Bennett, H. Standard Chemical and Tech-
nical Dictionary. '39 24:298
Childs, W. H. J. Physical Constants.
'34 18:188
Collins, A. Frederick Science for Young
Men. '46 30:245
DeMent, Jack and Dake, H. C. Uranium
and Atomic Power. '45 32:45-46
Frank, J. O. and White, H. K. High
School Science Terminology; Chemistry
and Physics. '30 14:576
Freeman, Ira M. Invitation to Experi-
ment. '40 15:171
Graydon, Thomas New Laws for Natural
Phenomena. 22:377
Hodgman and Lange Handbook of Physics
and Chemistry. 10:432
Hodgman and Lange Handbook of Chemistry
and Physics. 12:494
Hodgman, Charles D. Handbook of Chemis-
try and Physics. '32 17:162
Hodgman, Charles D. Handbook of Chemis-
try and Physics. '54 39:249
Kahn, Fritz Design of the Universe: The
Heavens and the Earth. '54 41:172
Jauncey, G. E. M. and Langsdorf, A. S.
M.K.S. Units and Dimensions. '40
25:291

Luckiesh, M. Foundations of the Universe.
'25 12:566
Millikan, R. A., Merriam, John C.,
Shapley, Harlow and Breasted, James
H. Time and Its Mysteries. '36
22:101
Palmer, Brooks The Romance of Time. . .
'54 41:442
Panth, Bholu D. Consider the Calendar.
'44 29:217
Richardson, E. G. Physical Science in
Art and Industry. '41 25:412
Richardson, E. G. Physical Science in
Modern Life. '39 23:356
Roller, Duane The Terminology of Physi-
cal Science. '29 14:468
Shapley, Harlow, Wright, Helen and
Rapport, Samuel (Editors) Readings
in the Physical Sciences. '48 34:
330
Ward, A. G. The Nature of Crystals.
'39 25:120
Wilson, P. W. The Romance of the
Calendar. '37 21:167
Time and Its Mysteries, Series III.
'49 34:339

b. Physical Science — Atomics and Structure of Matter (Books for Children)

Beeler, Nelson F. and Branley, Franklyn
M. Experiments with Atomics. '54
39:80
Gamow, George Mr. Tompkins Explores the
Atom. '44 28:296

Leeds, Roslyn D. Introducing the Atom.
'67 52:508-09
Lewellen, John You and Atomic Energy
and Its Wonderful Uses. '49 33:
304

b. Physical Science — Atoms and Structure of Matter (Books for Adults)

- Anderson, William R. The Useful Atom. '66 52:512
- Bohr, Niels Atomic Theory and the Description of Nature. '34 19:80
- Bova, Ben The Fourth State of Matter: Plasma Dynamics and Tomorrow's Technology. '71 56:582-83
- Briscoe, Herman T. The Structure and Properties of Matter. '35 19:197-98
- Buckingham, John Matter and Radiation. '30
- Conn, G. K. T. The Nature of the Atom and the Wave Nature of the Electron. '39 25:58
- Crehore, Albert Cushing Electrons, Atoms, Molecules. '46 31:40
- Darwin, C. G. The New Conceptions of Matter. '31 16:435-36
- Darrow, Karl K. Atomic Energy. '48 34:332
- Davis, Helen Miles (Editor) Atomic Facts. '50 37:350
- Fearnside, K., Jones, E. W. and Shaw, E. N. Applied Atomic Energy. '54 39:255
- Eidinoff, Maxwell Leigh and Ruchlis, Hyman Atomics for the Millions. '47 31:331
- Frisch, O. R. Meet the Atoms. '47 31:333
- Glasstone, Samuel Sourcebook on Atomic Energy. '67 52:(1)BC
- Haas, Arthur The World of Atoms. '37 22:217
- Heisenberg, W. Nuclear Physics. '53 38:323
- Hochstrasser, Robin M. Behavior of Electrons in Atoms. '64 52:515
- Langdon-Davies, John Inside the Atom. '33 18:255
- Mandelker, Jacob Matter, Energy and Mechanics. '54 39:247
- Millikan, Robert A. Electrons (+ and -): Protons, Photons, Neutrons, Mesotrons, and Cosmic Rays. '47 31:332
- Parker, Bertha Morris Matter and Molecules. '47 32:288
- Peacocke, T. A. H. Atomic and Nuclear Chemistry, Volume 1. Atomic Theory and Structure of the Atom. '68 52:179
- Potter, Robert D. Young People's Book of Atomic Energy. '46 31:112
- Soddy, Frederick The Interpretation of the Atom. '32 17:249
- Shannon, James I. The Amazing Electron. '46 33:80
- Solomon, Arthur K. Why Smash Atoms? '40 25:292
- Solomon, Arthur K. Why Smash Atoms? '46 30:164
- Stout, Wesley W. Secret. '47 34:332
- United States Atomic Energy Commission Major Activities in the Atomic Energy Programs. '56 41:440
- Wilson, H. A. The Mysteries of the Atom. '34 18:190
- Wilson, William The Microphysical World. '54 40:163
- Nuclear Terms: A Brief Glossary. '67 52:519

c. Physical Science — Water (Books for Children)

- Baer, Marian E. The Wonders of Water. '39 23:398
- Clymer, Eleanor Make Way for Water. '53 39:77
- Edelstadt, Vera Oceans in the Sky. '46 31:119
- Norling, Jo and Ernest The First Book of Water. '52 38:114
- Pigman, Augustus A Story of Water. '38 23:113
- Riedman, Sarah R. Water for People. '52 37:72
- Walsh, Mary Water, Water Everywhere. '53 38:110

c. Physical Science — Water (Books for Adults)

- Briggs, Peter Water: The Vital Essence. '67 53:176
- Davis, Kenneth S. and Dag, John Arthur Water: The Mirror of Science. 52:101
- Draffin, Jasper Owen The Story of Man's Quest for Water. '39 23:352
- Garnett, William A Little Book on Water Supply. 7:71
- King, Thomson Water. '53 37:274
- The President's Water Resources Policy Commission. Vol. 1: A Water Policy for the American People; Vol. 2: Ten Rivers in America's Future. '51 35:231

Woodbury, David O. Fresh Water from Salty Seas. '67 52:508

d. Chemistry and Chemical Industries (Books for Children)

- Baker, R. Ray So That's Chemistry. '40 25:172
 Beeler, Nelson and Branley, Franklyn Experiments in Chemistry. '52 37:281
 Buehr, Walter Plastics: The Man-Made Miracle. '67 52:96
 Freeman, Mae and Ira Fun with Chemistry. '44 30:107
 Horning, John L. and McGinnis, George C. An Open Door to Chemistry. '46 30:245-46
 Morgan, Alfred First Chemical Book for Boys and Girls. '50 35:58
 Morgan, Alfred Things a Boy Can Do With Chemistry. '40 25:178
 Morgan, Alfred Things a Boy Can Do With Electrochemistry. '40 25:412
 Petersham, Maud and Miska The Story Book of Iron and Steel. '35 21:117
 Stone, A. Harris The Chemistry of a Lemon. '66 51:414
 Straus, Jacqueline Harris Let's Experiment: Chemistry for Boys and Girls. '62 52:85

d. Chemistry and Chemical Industries (Books for Adults)

- Alico, John Introduction to Magnesium and Its Alloys. '45 30:53
 Anonymous The Detection and Identification of War Gases. Notes for the Use of Gas Identification Officers. '40 25:60
 Anonymous Gasoline by Synthesis. '48 32:376
 Anonymous Glyco Cosmetic Manual. '38 22:374
 Anonymous Medical Manual of Chemical Warfare. '41 27:43
 Amis, Edward S. Kinetics of Chemical Change in Solution. '49 34:206
 Armstrong, E. F. and Miall, L. M. Raw Materials from the Sea. '46 32:57
 Baker, A. J., Cairns, T., Eglinton, G. and Preston, F. J. More Spectroscopic Problems in Organic Chemistry. '67 52:520
 Bebie, Jules Manual of Explosives, Military Pyrotechnics and Chemical Warfare Agents. '43 28:183
 Bennett, H. (Editor) The Chemical Formulary. '33 21:54
 Bennett, H. (Editor-in-Chief) The Chemical Formulary. '39 23:295
 Bennett, H. The Chemical Formulary. '41 26:111
 Bennett, H. The Chemical Formulary. '45 30:105-06
 Bennett, H. The Chemical Formulary. '48 32:377
 Bennett, H. Chemical Specialties. '46 32:52
 Bennett, H. Concise Chemical and Technical Dictionary. '47 32:52
 Bennett, H. Practical Everyday Chemistry. '34 20:184
 Bunzell, H. H. and Nisenson, Samuel Everyday Chemistry. '37 22:327
 Chen, Philip S. A New Handbook of Chemistry. '75 60:426
 Chilton, Thomas H. Strong Water. '66 53:176
 Clarke, Beverly L. Marvels of Modern Chemistry. '32 17:349
 Collins, A. Frederick How to Understand Chemistry. '32 18:55
 Collins, A. Frederick The March of Chemistry. '36 22:49
 Collins, A. Frederick The Metals. '32 17:349
 Davis, Helen Miles The Chemical Elements. '52 38:328
 Day, Allan R. Electronic Mechanisms of Organic Reactions. '50 34:328
 Duck, Edward W. Plastics and Rubbers. '71 56:436
 Ehrenfeld, Louis The Story of Common Things. '32 17:249
 Epstein, Sam and Beryl The First Book of Glass. '55 43:280
 Faraday, Joseph E. Encyclopedia of Hydrocarbon Compounds, Vol. I: C1 to C5. '46 30:252
 Findlay, Alexander Chemistry in the Service of Man. '39 25:116
 Fisher, Harry L. Rubber and Its Use. '41 26:57
 Freeman, Ira M. All About the Wonders of Chemistry. '54 41:360
 Glasstone, Samuel Chemistry in Daily Life. '28 14:386
 Glasstone, Samuel Recent Advances in General Chemistry. '36 21:221
 Glasstone, Samuel Recent Discoveries in Physical Chemistry. '31 17:80
 Hackh, Ingo D. W. A Chemical Dictionary. '28 14:468
 Hackh, Ingo D. W. Structure Symbols of Organic Compounds. '31 16:254-55

- Harry, Ralph G. Modern Cosmeticology. '40 24:414
- Hausner, Henry H. Powder Metallurgy. '47 32:52
- Haynes, William Cellulose: The Chemical that Grows. 38:318
- Haynes, William The Stone that Burns. '42 27:50
- Hershey, J. Willard The Book of Diamonds. '40 24:414
- Kessel, F. A., Martin, W. J. and Hessel, M. S. Chemistry in Warfare. '40 25:116
- Hill, Terrell L. Lectures on Matter and Equilibrium. '67 52:515
- Hodgman, Charles D. Chemical Tables from the Handbook of Chemistry and Physics. '38 23:298
- Holmes, Harry N. Out of the Test Tube. '41 26:55
- Holmes, Harry N. Out of the Test Tube. '34 19:139
- Howe and Turner Chemistry and the Home. '27 15:276
- Hume-Rothery, William Electrons, Atoms, Metals, and Alloys. '55 40:163
- Hyman, Herbert H. Noble-Gas Compounds. '63 52:517-18
- Jacobs, Morris J. The Chemical Analysis of Foods and Food Products. '38 22:374
- John, W. D. Modern Polishes and Specialties. '47 32:45
- Joralemon, Ira B. Romantic Copper, Its Lure and Lore. '34 19:198-99
- Kharsch, M. S. and Reinmuth, Otto Grignard Reactions of Non-Metallic Substances. '54 39:249
- Kolthoff, I. M. Acid Base Indicators. '37 22:102
- Latimer, Wendell M. and Hildebrand, Joel H. Reference Book of Inorganic Chemistry. '51 36:311
- Latimer, W. M. and Hildebrand, J. H. Reference Book of Inorganic Chemistry. '40 25:296-97
- Long, Herta R. Alpha ray-Beta ray Emission Chart. '50 35:58
- Luder, W. F. and Zuffanti, Saverio The Electronic Theory of Acids and Bases. '46 31:39
- Mantell, C. L. Sparks from the Electrode. '33 17:344
- Mayer, A. W. Chemical Technical Dictionary. '43 28:183
- McMillen, Wheeler New Riches from the Soil. '46 32:59
- Meade, Richard K. Portland Cement. '39 25:293
- The Merck Index of Chemicals and Drugs. '52 36:311
- Mersereau, Samuel Foster Materials of Industry. '41 27:43
- Metcalfe, June Aluminum from Mine to Sky. '47 36:62
- Metcalfe, June M. Copper, the Red Metal. '44 30:55
- Noyes, William Albert and Noyes, W. Albert Modern Alchemy. '32 21:51
- Pearl, Richard M. The Wonder World of Metals. '66 52:508
- Perry, Josephine The Chemical Industry, The Glass Industry, The Electrical Industry, Fish Production, The Coal Industry, The Cotton Industry, The Steel Industry, Forestry and Lumbering, and Milk Production. '40-45 30:107
- Perry, Josephine The Light Metals Industry. '47 32:49
- Perry, Josephine The Petroleum Industry. '46 30:253
- Perry, Josephine The Plastics Industry. '47 32:48-49
- Perry, Josephine The Rubber Industry. '46 32:49
- Porter, Harold M. Chemistry of Foods and Household Materials. '37 22:334
- Read, William Thornton Industrial Chemistry. '33 20:117
- Rivett, A. C. D. The Phase Rule. 8:531
- Rogers, Frances and Beard, Alice 5000 Years of Glass. '37 22:375
- Sabel, William Basic Techniques of Preparative Organic Chemistry. '67 53:180
- Sand, Henry S. Electrochemical Theory. '39 25:59
- Slack, A. V. Defense Against Famine: The Role of Fertilizer Industry. '70 55:586
- Slosson, Edwin E. Creative Chemistry. 5:185
- Snell, Foster Dee and Snell, Cornelia T. Chemicals of Commerce. '39 24:298
- Swezey, Kenneth M. Chemistry Magic. '56 41:239
- Sykes, Peter A Guidebook to Mechanism in Organic Chemistry. '70 57:100
- Symposium: The Chemical Industry Facts Book. '55 41:250
- Symposium: The Home Chemist. '34 21:54
- Wachtel, Curt Chemical Warfare. '41 27:43
- Wahl, Arthur C. and Bonner, Norman A. Radioactivity Applied to Chemistry. '51 36:61
- Weingart, George W. Pyrotechny. '39 25:294
- Williams, Trevor Illtyd The Elements of Chromatography. 40:163
- Wolfe, Bernard Plastics. '45 30:106

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e. General Physics (includes mechanics, energy and heat, light, sound and applications) (Books for Children)

Baer, Marian E. Sound. '52 37:276
 Branley, Franklyn M. and Vaughn, Eleanor K. Mickey's Magnets. '56 43:83
 Feravolo, Rocco V. Light. '61 51:414
 Fischer, Vera Kistiakowsky One Way Is Down. '67 52:100
 Hawks, Ellison The Romance of the Merchant Ship. '31 17:259
 Ilin, M. How the Automobile Learned to Run. '45 30:179
 Kettelkamp, Larry The Magic of Sound. '56 41:365
 Kettlekamp, Larry Shadows. '57 41:365
 Lewellen, John The True Book of Toys at Work. '53 39:76
 Lineaweaver, Marion The First Book of Sailing. '53 39:74
 McCullough, John G. and Kessler, Leonard Farther and Faster. '54 39:80

Nelson, Lee All the Sounds We Hear. '60 50:192
 Petersham, Maud and Miska The Story Book of Wheels. '35 21:117
 Pine, Tillie S. and Levine, Joseph Friction all Around. '60 49:BC
 Schneider, Herman and Nina Let's Look Inside Your House. '48 32:378
 Schneider, Herman and Nina Now Try This. '47 32:290
 Stone, A. Harris and Siegel, Bertram M. Take a Balloon. '67 52:99
 Tresselt, Alvin How Far Is Far? '64 52:506
 Van Metre, T. W. Trains, Tracks, and Travel. '46 30:321
 Zim, Herbert S. Things Around the House. '54 39:70
 Zim, Herbert S. What's Inside of Engines? '53 37:291

e. General Physics (includes mechanics, energy and heat, light, sound and applications) (Books for Adults)

Anderson, Rudolph E. The Story of the American Automobile. '50 34:340
 Angrist, Stanley W. and Hepler, Loren G. Order and Chaos: Laws of Energy and Entropy. '67 52:516
 Beck, George E. What Makes the Wheels Go Around. '31 17:258
 Bragg, Sir William The Universe of Light. '33 17:346
 Clark, W. M. Manual of Mechanical Movements. '33 17:343
 Collins, A. Frederick Experimental Optics. '33 18:255
 Collins, A. Frederick Simplified Household Mechanics. '39 25:117
 Committee on Colorimetry of the Optical Society of America The Science of Color. '53 38:248
 Crouse, William H. Understanding Science. '48 32:375
 Culver, Charles A. Musical Acoustics. '56 42:184
 Darrow, Floyd L. The New World of Physical Discovery. '30 16:86
 Darrow, Karl K. The Renaissance of Physics. '36 21:219
 Davis, William S. Practical Amateur Photography. '27 12:567
 Donworth, Albert B. Gravitation and the Atomic Bomb. '48 34:206
 Dunn, Carleton E. Natural Color Processes. '40 25:238
 Edgerton, Harold E. and Killian, James R., Jr. Flash. '39 25:234-35
 Evans, Ralph M. An Introduction to Color. '48 32:376

Fleming, J. A. Waves and Ripples. 8: 531
 Gabor, D. The Electron Microscope. '48 32:378
 Gamow, G. Mr. Tompkins in Wonder Land or Stories of c, G, and h. '40 25: 60
 Gamow, George Gravity. 52:101
 Halacy, D. S., Jr. Fuel Cells: Power for Tomorrow. '66 52:512
 Henney, Keith and Dudley, Beverly Handbook of Photography. '39 25:353
 Heyl, Paul R. New Frontiers of Physics. '30 16:85
 Hillson, Peter J. Photography: A Study in Versatility. '69 54:391
 Hirschlaff, E. Fluorescence and Phosphorescence. '38 23:178
 Huey, Edward G. What Makes the Wheels Go Round. '40 24:353
 Karlson, Paul The World Around Us. '36 21:124
 Kettering, Charles F. and Orth, Allen The New Necessity. '32 16:522
 Lewellen, John The Boy Scientist. '55 41:353-54
 Loewy, Raymond Locomotive. '37 21:217
 Low, A. M. Science for the Home. '38 23:296-97
 Luhr, Overton Physics Tells Why. '46 31:332
 Luckiesh, Mathew Color and Colors. '38 23:172
 Luhr, Overton Physics Tells Why. '43 30:109

- Mees, C. E. Kenneth Photography. '37 21:121
- Menzel, Donald H. (Editor) Fundamental Formulas of Physics. '55 41:255
- Morris, Percy A. Nature Photography Around the Year. '38 23:355
- Morwood, John Sailing Aerodynamics. '55 39:183
- Mott-Smith, Morton Heat and Its Workings. '33 18:27
- Mott-Smith, Morton The Story of Energy. '34 19:38
- Mott-Smith, Morton This Mechanical World. '31 16:168
- Nehrich, Richard B., Jr., Voran, Glenn I. and Dessel, Norman F. Atomic Light: Lasers--What They Are and How They Work. '68 52:510
- Newman, F. H. Recent Advances in Physics (Non-Atomic) '32 16:339
- Pye, D. R. Heat and Energy. 8:374
- Radley, J. A. and Grant, Julius Fluorescence Analysis in Ultra-Violet Light. '35 20:119
- Reck, Franklin M. and Claire Power from Start to Finish. '41 26:112
- Richardson, K. I. T. The Gyroscope Applied. '54 40:163
- Rothman, Milton A. The Laws of Physics. 52:516-17
- Schrodinger, Erwin Space-Time Structure. '50 35:56
- Siegbahn, Manne The Spectroscopy of X-Rays. 10:356
- Stroddard, Edward The Story of Power. '57 43:283
- Symposium: Precision Electrical Measurements. '56 42:94
- Wall, E. J. Photographic Emulsions. '29 14:570
- Wall, E. J. and Jordan, Franklin I. Photographic Facts and Formulas. '40 25:293
- Weiss, Harvey Sailing Small Boats. '67 52:(1)IBC
- Young, C. B. F. and Coons, K. W. Surface Active Agents. '45 30:172

f. Physics -- Electricity and Applications (Books for Children)

- Bendick, Jeanne Electronics for Young People. '47 36:62
- Bendick, Jeanne and Robert Television Works Like This. '54 39:72
- Baker, Bertha M. The Book of Electricity. '28 13:116
- Bragg, W. L. Electricity. '36 22:163
- Buehr, Walter Wonder Worker: The Story of Electricity. '61 52:96
- Corbett, Scott What Makes a Light Go On? '66 51:414
- Epstein, Sam and Beryl The First Book of Electricity. 52:(1)IBC
- Epstein, Sam and Beryl The First Book of Electricity. '53 39:73
- Gould, Jack All About Radio and Television. 41:359
- Meyer, Jerome S. Picture Book of Radio and Television and How They Work. '51 38:115
- Morgan, Alfred A First Electrical Book for Boys. '35 20:185
- Morgan, Alfred A First Electrical Book for Boys. '51 36:59
- Morgan, Alfred First Radio Book for Boys. '41 26:110
- Morgan, Alfred Things a Boy Can Do with Electricity. '38 22:379
- Podendorf, Illa The True Book of Magnets and Electricity. '61 48:200
- Schneider, Herman and Nina Let's Find Out About Electricity. '56 41:346
- Schneider, Herman and Nina Your Telephone and How It Works. '52 37:269
- Shay, Arthur What Happens When You Make a Telephone Call. '68 52:509
- Webster, Hanson H. The World's Messengers. '34 19:89

f. Physics -- Electricity and Applications (Books for Adults)

- Brown, George H., Hoyler, Cyril N. and Bierwirth, Rudolph A. Theory and Application of Radio-Frequency Heating. '47 32:53
- Brown, O. F. The Elements of Radio-Communication. 12:356
- Caverly, Don Primer of Electronics and Radiant Energy. '52 38:323
- Collins, A. Frederick Fun with Electricity. '36 21:166
- Collins, A. Frederick How to Understand Electricity. '35 21:166
- Cowan, Lester (Editor) Recording Sound for Motion Pictures. '31 16:341
- Crow, Leonard R. Synchronos, Self-Synchronous Devices and Electrical Servo-Mechanisms. '53 38:324
- Denman, Frank Television, the Magic Window. '52 38:255
- Eddy, Capt. Wm. C. Television. '45 30:172
- Felix, Edgar H. Television. '31 16:340-41
- Freeman, Samuel Two-Way Radio. '46 30:171

- Grimes, David Meet the Electron. '44 29:108
 Hale, A. P. Electrical Interference. '56 42:95
 Harlow, Alvin F. Old Wires and New Waves. '36 21:221
 Hawks, Ellison The Book of Electrical Wonders. '31 16:434
 Hylander, C. J. and Harding, R., Jr. An Introduction to Television. '46 30:250
 Ilin, M. Turning Night into Day. The Story of Lighting. '36 22:49
 Johnson, J. Richard Television: How It Works. '56 41:443
 Krugman, Leonard Fundamentals of Transistors. '54 41:258
 Langdon-Davies, John Radio. '35 21:166
 Low, A. M. Electronics Everywhere. '52 39:174
 Lunt, Joseph R. Everyday Electricity. '27 12:570
 MacLaurin, W. Rupert Invention and Innovation in the Radio Industry. '49 34:208
 Mark, David Basics of Phototubes and Photocells. '56 41:443
 Morgan, Alfred Getting Acquainted with Electricity. '42 27:50
 Morgan, Alfred Getting Acquainted with Radio. '40 25:237
 Moseley, Sydney A. and McKay, Herbert Television. '36 21:221
 Poole, Lynn and Gray Electronics in Medicine. '64 48:434
 Rider, John F. Basic Vacuum Tubes and Their Uses. '55 41:256
 Samuels, M. M. Power Unleashed. '46 31:37
 Sommers, A. Photoelectric Cells. '47 32:52
 Squier, George O. Telling the World. '33 17:346
 Stokley, James Electrons in Action. '46 30:313
 Taylor, Denis Introduction to Radar and Radar Techniques. '67 53:180
 Tyler, Kingdon S. Telecasting in Color. '46 32:56-57
 Wade, Herbert T. Everyday Electricity. '24 12:568
 Woodbury, David O. Communication. '31 16:340
 Yates, Raymond F. Fun with Electronics. '45 30:107
 Yates, Raymond F. New Television: The Magic Screen. '48 22:376
 Yates, Raymond F. The Amazing Electrons. '37 23:232
 Yates, Raymond F. The Working Electron. '46 30:304
 Young, Victor J. Understanding Microwaves. 41:257

g. Earth Science — Geology, Physical Geography,
 Mineralogy (Books for Children)

- Branley, Franklyn M. North, South, East, and West. '66 52:102
 Clark, Mary Lou You and How the World Began. '57 41:368
 Cormack, M. B. The First Book of Stones. '50 38:113
 Goetz, Della Deserts. '56 41:362
 Goetz, Della Mountains. '62 52:95
 Hellman, Hal Navigation: Land, Sea, and Sky. '66 52:98
 Huntington, Harriet E. Let's Go to the Desert. '49 33:379
 Keene, Melvin The Beginner's Story of Rock and Minerals. '66 52:86
 Kennamer, Lorrin and Wishart, A. Paul Geography. '62 49:498
 McDonald, Lucille Saunders Jewels and Gems. '40 25:238
 Pease, Josephine van Dolzen This Is the World. '46 31:108
 Pine, Tillie S. and Levine, Joseph Air All Around. 52:80
 Podendorf, Illa The True Book of Seasons. '55 41:350
 Pough, Frederick H. All About Volcanoes and Earthquakes. 41:360
 Russell, Solveig Paulson From Rocks to Rockets. '60 52:92
 Schneider, Herman and Nina Follow the Sunset. '52 37:269
 Schneider, Herman and Nina Rocks, Rivers, and the Changing Earth. '52 37:269
 Shannon, Terry Among the Rocks. 41:347
 Shuttlesworth, Dorthy The Story of Rocks. '56 41:347
 Stone, A. Harris and Ingmanson, Dale Rocks and Rills: A Look at Geology. '67 52:98
 Townsend, Herbret Our Wonderful Earth. '50 35:57
 Washburne, Carleton and Washburne, Hellen The Story of Earth and Sky. '33 19:86
 Zim, Herbert S. Waves. '67 52:93
 Zim, Herbert S. What's Inside the Earth? '53 39:70

g. Earth Science — Geology, Physical Geography,
Mineralogy (Books for Adults)

- Abbot, C. G. The Sun's Short Regular Variation and Its Large Effect on Terrestrial Temperatures. '47 33:79
- American Geological Institute Dictionary of Geological Terms. 52:220
- Atwood, Wallace W. The Physiographic Provinces of North America. '40 25:355
- Atwood, Wallace W. The Rocky Mountains. '45 30:104
- Baars, Donald L. Red Rock Country: The Geologic History of the Colorado Plateau. '72 57:551-52
- Barton, Robert Oceanology Today, Man Explores the Sea. '71 56:276-77
- Bascom, Willard Waves and Beaches: The Dynamics of the Ocean Surface. '64 52:521
- Battan, Louis J. The Unclean Sky. '66 51:396
- Beebe, William Exploring with Beebe. '32 19:43
- Beebe, William Nonsuch: Land-of Water. '32 17:160
- Behrman, Daniel Exploring the Ocean. '70 57:99
- Bell, H. S. Oil Shales and Shale Oils. '48 33:82
- Bradley, John Hodgdon Autobiography of Earth. '35 20:187
- Brindze, Ruth The Gulf Stream. '45 30:103
- Burhr, Walter Volcano. 50:2BC
- Carlisle, Norman Riches of the Sea. '68 52:510
- Cartner, William C. How We Know What on Earth Happened Before Man Arrived. '72 57:242
- Casteret, Norbert Ten Years Under the Earth. '38 23:356
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- Coleman, Satis N. Volcanoes, New and Old. '46 30:314
- Coleman Ice Ages, Recent and Ancient. 11:60
- Daly, Reginald Aldworth The Changing World of the Ice Age. '35 22:273
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- Eakle, Arthur S. Mineral Tables. '38 23:354
- Ellsworth, Lincoln Exploring Today. '35 20:230
- Evans, Eva Knox Why We Live Where We Live. '53 39:180
- English, George Letchworth Getting Acquainted with Minerals. '35 20:112
- Fenton, Carroll Lane Along the Hill. '35 20:231
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- Fisher, James The Wonderful World of the Sea. '57 41:347-48
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- Flint, Richard Foster Glacial Geology and the Pleistocene Epoch. '47 32:54
- Fryxell, Fritiof The Tetons: Interpretations of a Mountain Landscape. '46 30:309
- Gait, Robert I. Exploring Minerals and Crystals. '72 58:138
- Galt, Tom Volcano. '46 30:313-14
- Gamow, George Biography of the Earth. '48 32:376
- Gautier, E. F. Sahara, the Great Desert. '35 20:185
- Gluck, Nelson The River Jordan. '46 30:308-09
- Hamilton, Elizabeth The First Book of Caves. '56 43:282
- Hawkins, Alfred C. The Book of Minerals. '35 20:184
- Hawks, Ellison The Book of Natural Wonders. '35 20:184
- Hood, Peter How the Earth Is Made. '54 39:81
- Hotchkiss, William O. The Story of a Billion Years. '33 17:344
- Huntington, Harriet E. The Yosemite Story. '66 52:78
- Icenhower, J. B. The First Book of the Antarctic. '57 43:280
- Jagger, T. A. Volcanoes Declare War. '45 30:163
- Johnson, Gaylord The Story of Earthquakes and Volcanoes. '38 22:331
- Joly The Surface History of the Earth. 10:508
- Koeppel, Clarence E. Earth and Sun Relations. '34 20:115
- Leveson, David A Sense of the Earth. '72 57:245
- Linklater, Eric The Voyage of the Challenger. '72 57:241
- Lynch, Joseph Dur Trembling Earth. '40 25:235
- Marmer, H. A. The Sea. '30 16:170-71
- Morris, Frederick K. The Making of the Valley. '36 21:53
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- Paul, J. Harland The Last Cruise of the Carnegie. '32 16:518
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- Peattie, Roderick (Editor) The Pacific Coast Ranges. '46 30:310
- Price, George McReady Common Sense Geology. '46 33:82
- Read, Thomas T. Our Mineral Civilization. '32 17:162
- Reinfeld, Fred Picture Book of Rocks and Minerals. '63 50:400
- Robinson, Arthur H. Elements of Cartography. '53 38:317
- Rosevear, Francis Burr Science Craft Mineralogy Manual. '36 22:334
- Schwartz, George M. and Thiel, George A. Minnesota's Rocks and Waters. '54 39:169
- Scott, J. M. The Polar Regions. 21:116
- Shand, S. J. Earth Lore. '38 23:172
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- Sherman, Robert C. Life and Death of the Soil. '55 41:239
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- Smith, Chard Powers The Housatonic. '46 30:309-10
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- Stewart-Remington, John and Francis, Wilfrid The Composition and Assaying of Minerals. '53 38:318
- Stommel, Henry Science of the Seven Seas. '45 30:54
- Taylor, Griffith Antarctic Adventure and Research. '30 16:170
- Vaeth, J. Gordon 200 Miles Up. '55 41:245
- Verrill, A Hyatt Minerals, Metals and Gems. '39 24:118
- Wahlstrom, Ernest E. Petrographic Mineralogy. '55 41:254
- Waters, Frank The Colorado. '46 31:342
- Williams, Henry Smith The Biography of Mother Earth. '31 16:521
- Zodac, Peter How to Collect Minerals. '34 20:113

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- Bendick, Jeanne Lightning. '61 50:192
- Fenton, Carroll Lane and Fenton, Mildred Adams Our Changing Weather. '54 39:91
- Friskey, Margaret The True Book of Air Around Us. 38:112
- Lehr, Paul E., Burnett, R. Will and Zim, Herbert S. Weather. '57 41:343
- Kinney, Jean What Does the Cloud Do? '67 52:(1)IBC
- Larrick, Nancy Rain, Hail, Sleet and Snow. '61 51:414
- Meyer, Jerome S. Picture Book of the Weather. '48 33:305
- Podendorf, Illa The True Book of Weather Experiments. '61 48:200
- Ridgley, Douglas C. Rainfall of the Earth. '33 18:192
- Schneider, Herman Everyday Weather and How It Works. '51 36:200
- Schneider, Herman and Nina Let's Find Out About the Weather. '56 41:346
- Smith, Theresa K. The Fog Is Secret. '66 52:98
- Sutton, Felix The How and Why Wonder Book of Our Earth. '60 50:192
- Tannehill, Ivan Ray All About the Weather. 41:359
- Wylar, Rose The First Book of Weather. 52:(1)IBC
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- Washburn, Stanley, Jr. Nimbo, the Little Cloud that Turned Black. '54 43:85
- Zim, Herbert S. Lightning and Thunder. '52 37:271

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- Battan, Louis J. The Nature of Violent Storms. 52:101
- Blair, Thomas A. Weather Elements. '37 22:105
- Botley, C. M. The Air and Its Mysteries. '40 25:173
- Brooks, Charles Franklin Why the Weather? '35 19:196
- Clayton, H. Helm and Clayton, Frances L. World Weather Records. '47 33:79

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- Felton, Ernest L. California's Many Climates. '65 51:103
 Gaer, Joseph Fair and Warmer. '39 25:173
 Hare, F. K. The Restless Atmosphere. '63 52:508
 Humphreys, W. J. Ways of the Weather. '43 30:103
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 Loebbeck, Theo Our Atmosphere. 52:514
 Longstreth, T. Morris Understanding the Weather. '53 38:255
 Luckiesh, Mathew The Book of the Sky. '33 18:189
 McEachron, K. B. and Patrick, Kenneth G. Playing with Lightning. '40 25:352
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 Nakaya, Ukichiro Snow Crystals. '54 41:258
 Petersen, William Man--Weather and Sun. '47 34:280
 Pickwell, Gayle Weather. '37 22:378
 Ridgley, Douglas C. General Circulation of the Atmosphere. '33 18:128
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 Starr, Victor P. Basic Principles of Weather Forecasting. '42 28:55
 Tannehill, Ivan Ray Weather Round the World. '43 30:104
 Van Straten, Florence W. Weather or Not. '66 53:181
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 Bernhard, Hubert J., Bennett, Dorothy A. and Rice, Hugh S. Handbook of the Heavens. '35 19:199
 Coles, Robert P. and Frost, Frances Star of Wonder. '53 39:72
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 Freeman, Mae and Ira Fun with Astronomy. '53 39:86
 Joseph, Joseph Maron and Lippincott, Sarah Lee Point to the Stars. '67 51:413
 Kinney, Jean What Does the Sun Do? '67 53:178
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 Meyer, Jerome S. Picture Book of Astronomy. '45 30:179
 Neurath, Marie Let's Look at the Sky. '52 38:115
 Proctor, Mary Our Stars Month by Month. '37 23:236
 Schneider, Herman and Nina You Among the Stars. '51 36:200
 Warner, Gertrude Chandler Star Stories. '47 33:303
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 Williams, Lou A Dipper Full of Stars. '44 29:281
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- Abbot, C. G. The Earth and the Stars. '46 31:34
 Allen, John Stuart Astronomy: What Everyone Should Know. '45 30:106
 Alter, Dinsmore and Clemminshaw, Clarence H. Pictorial Astronomy. '52 37:141
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- Baker, Robert H. Introducing the Constellations. '37 22:209
- Baker, Robert H. The Universe Unfolding. '32 16:339
- Baker, Robert H. When the Stars Come Out. '34 19:199
- Baldwin, Ralph B. The Face of the Moon. '49 34:337-38
- Barton, Samuel G. and Barton, William H. A Guide to the Constellations. '35 19:199
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- Bok, Bart J. and Bok, Priscilla F. The Milky Way. '45 30:110
- Bondi, Hermann The Universe at Large. 52:101
- Bova, Ben The New Astronomies. '72 57:105-06
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- Couderc, Paul The Expansion of the Universe. '52 38:241
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- De Sitter, W. Kosmos. '32 18:256
- Draper, Arthur L. and Lockwood, Marion The Story of Astronomy. '39 23:295
- Duncan, John Charles Essentials of Astronomy. '42 28:111
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- Edwards, Lawrence The Spangled Heavens. '33 18:127-28
- Fath, Edward Arthur Through the Telescope. '36 21:49
- Fisher, Clyde Exploring the Heavens. '37 22:44
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- Gamow, George The Birth and Death of the Sun. '52 38:241
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- Grondal The Music of the Spheres. 11:64
- Hagner, F. H. What Goes on Around You. '46 31:110
- Harding, Arthur M. Astronomy. '35 21:259
- Heidi, Fritz Meteorites. '64 48:392
- Holman, Jessie B. An Easy Guide to Astronomy. '40 25:354-55
- Jeans, Sir James The Mysterious Universe. '30 16:84
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- Jennison, R. C. Introduction to Radio Astronomy. '67 53:178
- Jones, H. Spencer Life on Other Worlds. '40 25:296
- Jones, H. Spencer Worlds Without End. '35 21:56
- Key, H. A. The Stars: A New Way to See Them. '52 38:107
- Lee, Oliver Justin Beyond Yonder. '39 25:118
- Lee, Oliver Justin Measuring Our Universe. '50 34:338-39
- Lemon, Harvey Brace Cosmic Rays Thus Far. '36 21:221
- Lewellen, John You and Space Neighbors. '53 39:75
- Lewis, Isabel Astronomy for Young Folks. '32 18:199
- Lum, Peter The Stars in Our Heavens. '48 33:304
- MacPherson, Hector Modern Astronomy. 11:289
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- Marshall, Roy K. Sun, Moon, and Planets. '52 38:240
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- McKready, Kelvin A Beginner's Star Book. '37 22:47
- McVittie, G. C. Cosmological Theory. '38 23:177
- Messel, H. and Butler, S. T. Space Physics and Radio Astronomy. '64 49:BC
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- Millikan, Robert A. Cosmic Rays. '39 25:297
- Mitchell, S. A. Eclipses of the Sun. '35 20:116
- Moseley, Edwin Lincoln Other Worlds. '33 20:188
- Moulton, Forest Ray Astronomy. '31 16:171-72
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- Neely, Henry M. A Primer for Star-Gazers. '46 31:118
- Ohring, George Weather on the Planets. '66 51:397
- Ordway, Frederick I., III Life in Other Solar Systems. '65 52:507
- Payne-Gaposchkin, Cecilia Stars in the Making. '53 38:242

- Pendray, G. Edward Men, Mirrors, and Stars. '35 22:43
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 Pickering, James Sayre The Stars Are Yours. '53 37:272
 Pickering, James S. 1001 Questions Answered About Astronomy. 52:90
 Polgreen, John and Cathleen The Stars Tonight. '67 52:89
 Reed, W. Maxwell Patterns in the Sky. '51 37:284
 Reh, Frank Astronomy for the Layman. '36 21:118
 Robinson, John The Universe We Live In. '52 38:241
 Russell, Henry Norris The Solar System and Its Origin. '35 22:162
 Sedgwick, J. B. Amateur Astronomer's Handbook. '55 41:252
 Shapley, Harlow Flights from Chaos. '30 16:172-73
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 Sidgwick, J. B. Observational Astronomy for Amateurs. '55 41:259
 Skilling, W. T. and Richardson, R. S. Sun, Moon and Stars. '46 31:192
 Smart, W. M. Astronomy. '37 22:276
 Stetson, Harlan True Man and the Stars. '30 16:172
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 Stokley, James Stars and Telescopes. '36 22:48
 Thomas, Oswald Heaven and Earth. '30 16:258-59
 Woodbury, David O. The Glass Giant of Palomar. '39 24:411
 Wylie, C. C. Our Starland. '38 23:114
 Williamson, Julia Stars Through Magic Casements. '30 15:72
 Wagner, Norton Unveiling the Universe. '36 21:123
 Whipple, Fred Earth, Moon and Planets. '46 30:315
 Watson, Fletcher G. Between the Planets. '45 30:316
 White, Anne Terry All About Stars. '54 41:359
 Willis, H. L. The Origin of the Solar System. '46 31:36
 Velikovsky, Immanuel Worlds in Collision. '50 34:341-42
 Zim, Herbert S. and Baker, Robert H. Stars. '51 37:270

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- Bendick, Jeanne The First Book of Space Travel. '53 38:114
 Beeler, Nelson and Branley, Franklin Experiments with Airplane Instruments. '53 38:111
 Burchard, Peter Balloons from Paper Bags to Skyhooks. '60 50:191
 Corbett, Scott What Makes a Plane Fly? '67 52:100
 Fraser, Chelsea The Model Aircraft Builder. '31 16:252
 Harney, Laura B. The Skycraft Book. '32 16:434
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 Neurath, Marie Rockets and Jets. 38:115
 Post, Augustus Skycraft. '33 18:196
 Reiner, William The Flying Rangers. '54 39:76

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- Black, Archibald The Story of Flying. '40 25:117-18
 Burnett, R. Will Operation Moon. '55 40:80
 Carlisle, Norman, Cleveland, Reginald and Wood, Jonathan The Modern Wonder Book of the Air. '45 30:107
 Caidin, Martin Destination Mars. '72 57:97-98
 Coombs, Charles Skyrocketing into the Unknown. '54 39:244
 Devon, Francis The Story of the Helicopter. '46 30:301-02
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 Fraser, Chelsea The Story of Aircraft. '33 20:187
 Gatland, Kenneth W. and Kunesch, Anthony M. Space Travel. '53 39:245
 Horsley, Terence Soaring Flight. '46 30:302
 Hylander, C. J. Flying Power. '43 30:250
 Joseph, Alexander Rockets into Space. '55 43:85
 Ley, Willy Missiles, Moonprobes, and Magaparsecs. '64 52:514

Leyson, Captain Burr W. Man, Rockets, and Space. '54 39:244
 Menzel, Donald H. Flying Saucers. '53 38:242
 Poole, Lynn Your Trip into Space. '53 39:245
 Ray, Jim The Story of American Aviation. '46 30:173

Smith, Maurice (Editor) Flight Handbook. '55 40:162
 Vallee, Jacques and Janine Challenge to Science: The UFO Enigma. '66 53:181
 Williams, Archibald Conquering the Air. 11:212
 Zim, Herbert S. Rockets and Jets. '45 29:219

k. General Technology (Books for Children)

Pease, Josephine Van Dolzen It Seems Like Magic. '46 31:108

Reynolds, Rollo G. (Editor) Our Changing World. 21:215

k. General Technology (Books for Adults)

Bonnell, Allen T. and Christman, Ruth C. (Editors) Industrial Science. '52 38:325
 Cressy, Edward Discoveries and Inventions. '30 14:572
 Hatfield, H. Stafford The Inventor and His World. '33 18:55
 Leonard, Jonathan Norton Tools of Tomorrow. '35 19:195
 Leyson, Captain Burr W. Modern Wonders and How They Work. '49 34:331
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Nida, William L. Man Conquers the World with Science. '34 21:117
 Polakov, Walter N. The Power Age. '33 19:85
 Weidlein, Edward R. and Hamor, William A. Glances at Industrial Research. '36 21:211
 Wheeler, Harold (General Editor) Marvels of the Modern World. '40 25:176
 Yates, Raymond F. Machines Over Men. '39 24:407

3. General Science (includes topics common to all sciences, e.g., research, and books about several sciences)

a. Bibliographies and Dictionaries

American Chemical Society Selected Titles in Chemistry--An Annotated Bibliography of Moderately Priced Books for the Student, the Teacher, and the General Reader. '72 56:583-84
 Arnett, Ross H., Jr. Books on Zoology. '56 42:96
 Blackwood, Paul E. Science Experiment Books for Children; Experiments in Elementary Science. 37:268
 Bureau of Curriculum Research A Selected Bibliography in Elementary Science. '55 41:346
 Callahan, Ludmilla I. Russian-English Technical and Chemical Dictionary. '47 32:220
 Deason, Hilary J. A Guide to Science Reading. '66 53:176
 Gordon, Eva L. A Bibliography of Nature Study. '39 24:177
 Guerrero, Antonio Perol New Technical and Commercial Dictionary. '42 27:51
 Langvick, Mina M. and Noll, Victor H. U.S. Government Publications Useful to Teachers of Science. '32 18:124

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 Mallinson, George Griesen and Mallinson, Lois Marion A Bibliography of Reference Books for Elementary Science, 1952. '52 37:268
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 National Cancer Institute Reading on Cancer: An Annotated Bibliography. '55 42:183
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 Patterson, Austin M. A German-English Dictionary for Chemists. '50 34:342
 Rakestraw, Norris W. Journal of Chemical Education, 25-Year Cumulative Index. Vols. 1-25. 1924-1949. '52 38:249

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- Schwartz, Julius and Schneider, Herman Growing up with Science Books. '59 44:152
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- Tweney, C. F. and Hughes, L. E. C. Chamber's Technical Dictionary. '40 25:295
- Vinal, William Gould Nature Education: A Selected Bibliography. '34 20:110
- Webb, Hanor A. The High School Science Library for 1928-1929. 14:384
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- Williams, Alice Marietta Children's Choices in Science Books. '39 24:177
- Woodring, Oakes and Brown Enriched Teaching of Science in the High School. '28 13:186
- Bibliography of Material on Animal Experimentation. '54 39:250
- Catalog of Technical Books. 27:155
- Encouraging Future Scientists: Materials and Services Available in 56. '55 40:79
- Science Booklists for Boys and Girls. 23:112

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- Abbott, Charles G. Everyday Mysteries. 8:450
- Bendick, Jeanne All Around You. '51 37:145
- Broekel, Ray You and the Sciences of Plants, Animals, and the Earth. '56 41:367
- Brown, Vinson How to Make a Home Nature Museum. '54 39:88
- Coffman, Ramon Peyton The Child's Story of Science. 24:180
- Davis, Watson Science Picture Parade. '40 25:178
- Harrison, Caroline and Washburn, Bradford Allen and Trisha Visit the Science Park. '53 37:277
- Harrison, Lucia Daylight, Twilight, Darkness and Time. '35 19:137
- Herbert, Don Mr. Wizard's Science Secrets. '52 37:282
- Ilin, M. 100,000 Whys. '33 18:188
- Jaeger, Ellsworth Land and Water Trails. '53 39:241
- Larrick, Nancy See for Yourself: A First Grade Book of Science Experiments. '52 37:292
- Lindberg, G. and M. Our Amazing World. '68 52:510-11
- Lynde, Carleton John Science Experiences with Home Equipment. '37 21:258
- Lynde, C. J. Science Experience with Inexpensive Equipment. '39 23:291
- McCreery, James L. Exploring the Earth and Its Life. '40 26:111
- Moseley, Edwin Lincoln Trees, Stars, and Birds. '35 21:211
- Nelson, Eugene W. The Magic Wand of Science. '38 23:295
- Parker, Bertha Morris The Golden Book of Science. '56 41:343-44
- Parker, Bertha Morris The Golden Treasury of Natural History. '53 39:68

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- Podendorf, Illa Pebbles and Shells. '54 39:75
- Podendorf, Illa The True Book of Science Experiments. '56 41:367
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- Schloat, G. Warren, Jr. The Magic of Water. '55 43:278
- Schneider, Herman and Nina How Big Is Big? '46 31:108
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- Schwartz, Julius It's Fun to Know why. '52 37:281
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- Udane, Bernard and Gillary, Herman Student's Handbook of Science. '48 32:377
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- Cable, E. J., Getchell, R. W. and Kadesch, W. H. Science in a Changing World. '46 30:245
- Chase, Carl Trueblood Frontiers of Science. '36 21:210
- Collins, A. Frederick Science on Parade. '40 25:118
- Compton, Ray and Nettels, Charles H. (Editors) Conquests of Science. '39 25:115; 25:411
- Davis, Watson Science Today. '31 16:525
- Davis, Watson (Editor) The Advance of Science. '35 22:160
- DeLeeuw, A. L. Rambling Through Science. '32 19:85
- Dietz, David The Story of Science. '32 19:42
- Freedman, Paul The Principles of Scientific Research. '50 34:342
- Frewin, J. G. A New Experimental Science, Part II. 12:356
- Furnas, C. C. The Next Hundred Years. '36 22:218
- Garbedian, H. Gordon Major Mysteries of Science. '33 20:231
- Gray, George W. The Advancing Front of Science. '37 21:259
- Haslett, A. W. Unsolved Problems of Science. '35 22:218
- Hunter, George W. and Whitford, Robert Calvin Readings in Science. '31 16:170
- Huxley, Julian and Andrade, E. N. daC. More Simple Science. '36 21:211
- Huxley, Julian and Andrade, E. N. daC. Simple Science. '35 20:187
- Jaffe, Bernard Outposts of Science. '35 21:166
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*Served as Chairman of the Editorial Board beginning with Vol. 13, no. 4, May 1929. The journal's name was changed from General Science Quarterly to Science Education with the May 1929 issue.

**Served as Editor through Vol. 27, no. 2, September-October 1945. Beginning with the November 1945 issue, the journal was published under the direction of the Committee of Publication (W. G. Whitman, Chairman) through Vol. 28, no. 4, October 1944, when S. R. Powers became Editor.

#Appointed as editor beginning with Vol. 52, no. 5, December 1968.

##Includes four regular issues plus "A Summary of Research in Science Education," containing 85 pages in volume 59 and 99 pages in Volume 60.